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COMMERCIAL FISHERIES REVIEW

A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES
PREPARED IN THE BRANCH OF COMMERCIAL FISHERIES

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COMMERCIAL FISHERIES REVIEW

August 1948 Washington 25, D.C. Vol.10, No.8

THE MARKETING AND PROCESSING OF FISH IN THE PHILIPPINES

By J. A. Clague *

INTRODUCTION

As is true throughout the Orient, fish is one of the main sources of animal protein for the people of the Republic of the Philippines; and since most Filipinos eat fish instead of meat strictly as a matter of preference, the fisheries play an important role in the economy of the country. An estimate of the fishery production before and after the last war is shown in Table 1, while the imports and exports are shown in Table 2.

Table 1 - Estimated Production of Fishery Products[1/]

Item	11 Months 1947	12 Months 1946	12 Months 1940
	lbs.	lbs.	lbs.
Production from:			
Commercial outfits	84,727,618	34,985,196	251,988,660
Fish ponds	45,734,920	35,420,000	44,732,600
Municipal and sustenance fisheries	260,925,078	38,638,600	77,278,740
Totals	391,387,616	109,043,796	374,000,000

1/ From Second Special Report, FAO, Philippine Committee, Manila, January 1948.

Recent information from the Philippine Bureau of Fisheries indicates that the 1947 fish catch by commercial fishermen amounted to 84,727,618 pounds. There was quite a vigorous upward trend in the increase of commercial fishing during 1947. It is evident that progress is being made in the rehabilitation of the fisheries, but considerable work still needs to be done to get the yield back to the prewar total.

FIG.1 - NATIVES START DAY WITH A FISHING EXCURSION INTO THE SURF USING A BEACH SEINE

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Formerly, the bulk of the commercial catch brought into the large city markets was taken by Japanese boats having a Japanese master fisherman and engineer,

Table 2 - Estimated Imports and Exports of Fishery Products[1/]

Item	1946	1940
	lbs.	lbs.
Imports	46,812,618	24,422,671
Exports	5,119,624 [2/]	2,066,541

1/ Special Report, FAO, Philippine Committee, Manila, August 1947.
2/ Only 629,690 pounds are edible fishery products.

a Filipino licensed skipper or "patron" and a Filipino crew. The return of Japanese nationals to their homeland at the close of the war, therefore, provided an opportunity for new interests to get into the fishing industry, as is shown by the increase of licensed commercial fishing boats in Table 3. Also, the influx

Table 3 - Licensed Commercial Fishing Boats over Three Gross Tons[1/]

Item	1947	1946	1945	Prewar
Powered	191	117	40	-[2/]
Non-powered	291	227	12	-[2/]
Total	482	344	52	334

1/ From Second Special Report, FAO, Philippine Committee, Manila, January 1948.
2/ Data not available.

of fishing supplies, principally net twines and fish nets, promoted the brisk resumption of many fishing activities--both commercial and subsistence fishing. The high postwar price of fish was an added incentive, the average fresh fish price in 1946 being 58 cents a pound; and in 1947, 44 cents a pound as compared to a prewar average of 7 cents a pound. Many people with money to invest, but without previous fishing experience, bought equipment and hired crews to go after fish. The venture was profitable for many of the operators, particularly immediately after the war. However, the increase in the production of fishery products resulted in a decrease in value, and lately, the decrease in the price of fish has caused owners of fishing vessels who were only after a quick profit to get out of the business. In addition, the tendency of some crews to sell their catch "sub-rosa" has been another discouraging factor. This practice is liable to occur if the boat is fishing some distance away from the home port and the owner does not sail with the ship or otherwise have close control of the operation.

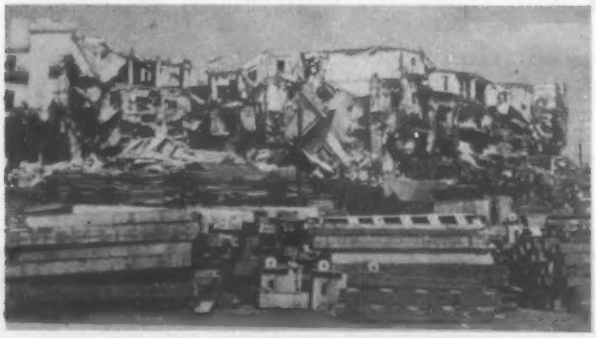


FIG. 2 - WAR DAMAGE IN MANILA. NEW BRIDGE STEEL IN FOREGROUND.

FISHING METHODS

Only a brief summary of the more important methods of catching fish will be presented in order to give a background to the discussion on marketing and process-

ing. It is planned to publish a detailed description of gear and fishing methods later.

The beam trawl, or utase, introduced by the Japanese is the chief method used for catching bottom fishes. The utase differs from the otter trawl in one major respect; a beam is used instead of doors to hold the mouth of the net open. This gear is employed extensively in Manila Bay, Lingayen Gulf, and off the coasts of western Negros, southwest of Bacolod, and off Samar and Panay Islands. Ragay Gulf is also a good trawling ground, but is not being fished much at the present time. The trawling grounds are limited, due to the restricted area of grounds within the 100-fathom curve, the presence of coral in some places, debris washed down rivers during flash floods in others, and war wreckage in still others.

A catch of 400 pounds of mixed fish for a drag of four hours with a beam trawl is considered a good haul, a typical breakdown of the percentage by weights of the types of fish taken being as follows:

Name	%	Remarks
Sap-sap	50	Slipmouths and other small fish.
Halo-halo	20	Miscellaneous medium sized fish, 8 to 12 inches long.
Kalaso	3	Lizard fish. They are not considered worth icing so are salted and brought back as deck cargo.
Joya	20	Miscellaneous big fish such as groupers, sea bass, and snappers.
Shrimp & squid	7-15	

The highest price is received for shrimp and squid, joya being the next in value, halo-halo next, and kalaso and sap-sap the least valuable.

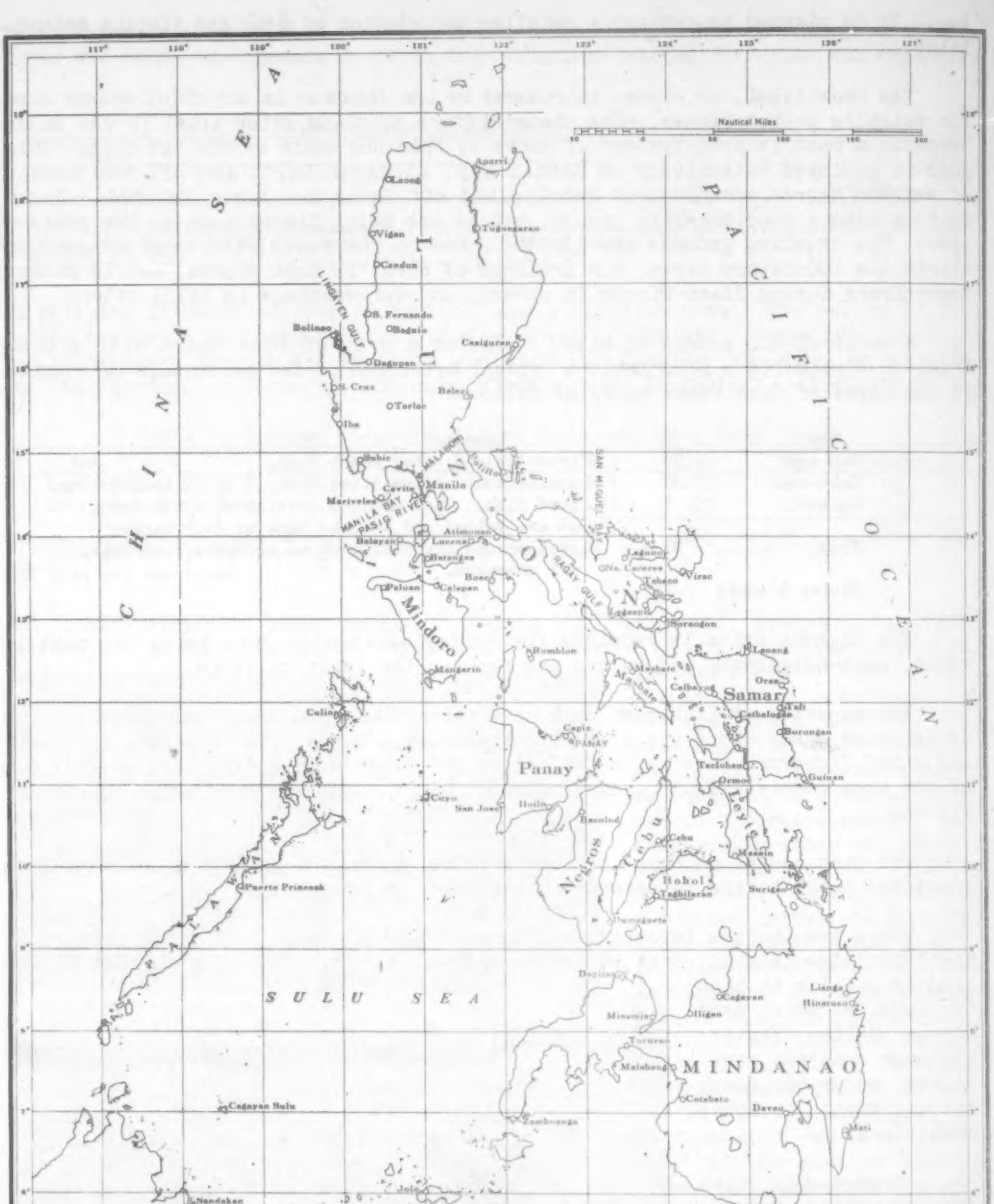
The majority of fishermen work on a salary basis, although there are reports of isolated cases where the crew gets shares or a bonus. The captain, engineer, and chief fishermen receive in the neighborhood of $6.00 a day while the balance of the crew received $3.50 a day, with a cut to half pay when the ship is not fishing.

All fish caught on beam trawlers are iced and the better types of ships have insulated holds to aid in preserving the catch on long hauls.

Traps are another important method of fishing. These are found throughout the Philippine Islands, both in salt and fresh water. The general plan of the trap is similar to that of traps or weirs used in the United States, although numerous variations occur to adapt the equipment to local conditions.

FIG. 3 - TYPICAL PHILIPPINE FISH TRAP

Trap-caught fish form the basis for a business carried on by one enterprising operator. He has a YP procured as surplus from the Navy. The ship had been used during the war to carry frozen and refrigerated provisions so it has ample freezing space, both for dry storage or for brine freezing, as desired. The owner



Philippine Islands

takes the ship to the southern Islands where traps are visited and any marketable catch bought and immediately frozen. As soon as a large enough pay load is obtained, the ship heads back to Manila. The capacity of the carrier is 100 tons but the fare brought in ordinarily amounts from 40 to 50 tons. In 1947, the owner reported a take of 500 tons, of which 350 tons were tuna or tuna-like fish.

Anchovies and other small fish are taken by a night light used in conjunction with sapiao nets (a round haul seine made of cotton twine). Basnigs nets used with lights are also employed to catch anchovies in Visayan Sea, the Batangas area, and Manila Bay.

FIG. 4 - FISHERMAN CASTING HIS NET

In addition, just about every type of gear used by fishermen in other parts of the world will be found here, including hand lines, cast nets, gill nets, beach seines, purse seines, and others.

A large percentage of the fish taken in the Philippines is obtained by dynamiting. To supply the Manila markets, PT boats are used as fish carriers, their source of fish being the fishing grounds off the northern tip of Palawan, located just south of Luzon. Dynamite is also used extensively for taking reef fish in the Sulu Sea. It is regrettable that such a method is used, but it also must be admitted that the procedure is an important factor in supplying food fish for the people. However, with the cooperation of other Government offices, the Bureau of Fisheries field men in 1947 waged a campaign against illegal fishing, particularly that done with the use of dynamite. But the lack of facilities hampers this work greatly.

MARKETING FRESH FISH

As a preface to a discussion of marketing, one peculiarity of the Philippine buyer should be pointed out. Filipinos, particularly in Manila, prefer buying their fish in the round because it is considered that the quality of the fish may be more readily determined when it is in that form. Unless a large fish is to be cut up and sold by the piece, all fish are therefore sold without eviscerating. Another factor to be considered is that fresh fish are far more acceptable than the frozen product, although the people are becoming more accustomed to the latter in the large markets.

Fresh-water fish sold on the Manila market are brought directly to the retail selling place by vendors who go out to the fishing grounds or by the fishermen themselves. Fish handled in this fashion are the murrel, catfish, mullet, carp, guramy, and climbing perch, a large part of which are caught in Laguna de Bay, a fresh-water lake several miles east of Manila.

Most of the marine fish are taken to landing centers and sold wholesale to the dealers who then take them to market places for resale. There were several such landing places before the war, but, at present, the only ones of any size in the Manila area are Navotas and the Royal Ice Plant.

The Navotas landing is located about 8 miles by road north of the center of Manila. The market consists of a series of sheds 200 yards in length built just above the high water mark on the beach. The sheds are open on the side facing the sea. Beam trawlers bringing in a catch anchor offshore and the catch is ferried ashore by a DUKW (an amphibious vehicle obtained from Army surplus). The beach here is long and gradual so that the DUKW is an ideal vehicle for servicing the fishing boats. The service charge is $6.00 per boat. The DUKWs have been used now for over a year, but will probably be eventually replaced by the large native dugouts called "bancas" which were formerly used for the servicing work.

FIG. 5 - TYPICAL RICE PADDY FISHERMAN

A flat tray with a split bamboo bottom is used to carry the fish from the boat to the landing and is the selling unit. The tray holds approximately 10 pounds of fish. Some fish are also sold in baskets holding 70 to 90 pounds.

The lots of fish are sold by secret bidding which consists of the bidders going up to the seller and whispering a price in his or her ear. When no more bids are forthcoming, the agent sells the lot to the highest bidder. The fish is then carried away in a jeep, truck, or horse-drawn carretela. The sale of fish starts at about 3:00 a.m. so that the product is in the retail market and usually sold to the consumer before the sun is high.

Another important wholesale fish market is Malabon, a mile or so from Navotas. At this point, the pond-raised bangos are brought into the market in "bancas" from the ponds around Manila Bay.

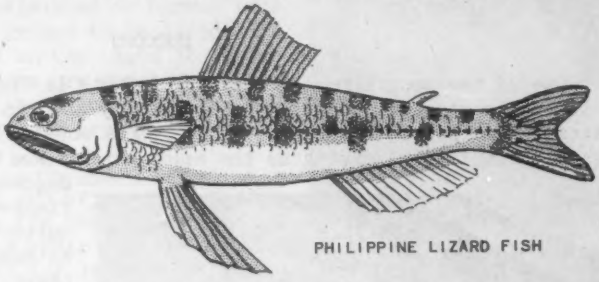
The product carried to the Royal Ice Plant consists primarily of reef fish brought up from Palawan, some beam-trawl caught fish and occasionally frozen fish, brought in by the YP to which previous reference has been made. Being located on the Pasig River right in the center of Manila--it is in a strategic position for selling fish. Much of the catch brought in here is held in frozen storage.

Fish are also brought to the Manila market by train from San Miguel Bay and Ragay Gulf, by truck from localities connected by good roads such as Batangas, and a considerable quantity is flown in by commercial airlines.

There are several large markets in Manila--Divisoria, Quiapo, Obrero, Bambang, Paco, Arranque, and Tondo, being the most important. Divisoria is the largest market and here the fish counters have a tile facing and a generally clean appearance.

Paco was reported to be a model of its kind before the war, with running water to all stalls, adequate drainage, and other modern features, but, as is true of most of the markets here now, much repair work will be necessary to bring it up to a good sanitary condition.

As was pointed out previously, most of the fish are sold in the round, and in some cases, particularly in that of the "dalag" (a murrel) the fish is still alive at the time of sale. In fact, the dealer keeps a club handy with which to hit the particular "dalag" which the customer buys to keep the fish from jumping out of the market basket. Some of the larger fish such as barracuda, Spanish mackerel, and tuna, are steaked and one small type, the lizard fish, is filleted. This is the only instance that has been noted where filleting is practiced in the Philippines.



PHILIPPINE LIZARD FISH

In the market places of the other cities in the Philippines, the fish markets are more or less like those in Manila, depending on the condition in which the ravages of the war left them. In Jolo, for example, some of the fish are displayed on the ground with only a banana leaf to keep the product from the pavement, and in some cases, the fish may be placed on the bare ground. The tables on which fish are cut up to be sold by the piece are often in an unsanitary condition, being covered with dried blood and scales. Lack of running water in the markets is one of the chief drawbacks to cleanliness, particularly in the provincial barrios.

PROCESSED PRODUCTS

Salted and Dried Fish

Salted and dried fish comprise the chief processed products now being prepared in the Philippines. For the most part, the industry is located in the central and southern part of the Republic. The Gigantes Islands, two small islands off the northeastern tip of Panay, are now the chief salting centers but, just as the industry moved from Estancia to Gigantes, shortly before the war, so now there is taking place a shift of some of the salteries from Gigantes to more southern regions, Zamboanga being one of the favored localities. The 18 salteries on the Gigantes Islands are reported to have produced over 2,000,000 pounds of salted fish during 1946, which sold for an average of 27 cents a pound.

Table 4 - Quantity and Value of Salted, Dried, and Smoked Fish Handled in Manila Markets in 1947 1/

Item	Weight	Value
	lbs.	
Kench Cured (Balbakua)	174,600	$ 70,050
Fish Paste (Bagoong)	6,031,000	815,040
Dried Split (Daing)	3,966,200	1,703,509
Dried Round (Tuyo)	8,544,200	3,147,760
Smoked Fish (Tinapa)	2,611,300	1,430,313

1/ Data obtained from Philippines Bureau of Fisheries.

Sitankai, one of the southernmost islands of the Philippines, is also an important salt fish producing place. The fish processed there are sold in Davao, Jolo, Zamboanga, and Cebu, as well as being shipped to Manila.

Figures are not available on the total quantity of processed fish produced in the Philippines, but Table 4, showing the products handled in the Manila markets during 1947, will give an indication of the relative importance of the different salted, dried, and smoked items.

Bagoong

One of the most important salted products is "bagoong," a type of fish paste. It is an important flavoring material widely used in the preparation of vegetable dishes. Some people often partake of meals consisting of rice, vegetables, and bagoong, the latter serving as the sauce which makes the vegetables more palatable. Bagoong is one of the few Philippine fishery products now exported, and quite a sizable amount is shipped to Hawaii for the Filipinos living there.

FIG. 6 - VIEW ABOARD A MANILA BAY TRAWLER SHOWING THE TRAYS ON WHICH THE FISH ARE HANDLED.

There are many different grades of bagoong, the better types being produced from goby and herring fry, anchovies, small sardines, and tiny shrimp, and the less desirable from slipmouths and other fish which do not have a ready sale on the fresh fish markets. In one locality, it was found that fish viscera were used for the manufacture of bagoong, and in another region bonito livers are considered to make the best product.

A typical procedure is to mix one part of salt to two parts of fish by weight. The ratio of salt to fish is only approximate since the manufacturer, in many instances, does not measure the quantities of either component, but judges by the appearance of the product the amount that is considered necessary. The salt and fish are thoroughly mixed together, either on mats, in wooden vats, or in worn-out "bancas" (native dugout canoes). The mixture is then transferred to a container for fermentation—50-gallon oil drums being used in some cases, concrete vats in others. In some instances, the fish are ground in a food chopper before mixing with the salt.

Fermentation proceeds for one to three days in the vat after which the mixture is transferred to 5-gallon square metal cans. Unless the vats and cans are covered with screening during the fermentation, flies will deposit eggs which develop into maggots during the process. After standing in the cans for a week, most of the gas from the fermentation has escaped, and a piece of tinplate is soldered over the circular opening in the top of the can and the product is ready for shipment.

Salt Fish

Small fish are cured in the round. After washing in sea water, they are placed in concrete brining tanks containing a strong brine solution which, in some cases, is saturated, but more often is of an indeterminate salt content. If the brine is considered to be weak, additional salt is sprinkled over the surface of the fish and they are left in the solution for from three to five hours. Then they are washed in sea water, placed on split bamboo matting trays which are elevated on bamboo rods set about three feet off the ground to be dried. The fish are occasionally turned on the mats to insure uniform drying. The drying racks are sometimes situated over the water in order to eliminate flies and to get better conditions for rapid drying.

FIG. 7 - BASKETS CONTAINING ICED FISH READY TO BE SHIPPED FROM BATANGAS TO MANILA BY TRUCK.

Medium fish are split along the back, eviscerated and laid open, before salting and drying. Large fish are split three times so that the backbone forms one section and the two sides the other sections. The fish can thus be laid out flat for drying. Diagonal cuts are also made in the sides of the thicker pieces to facilitate penetration of the salt.

Salt fish produced in the salteries on the Gigantes Islands, largest center of the industry, are packed in 55-pound boxes made from Philippine mahogany, which cost the processor about 75 cents each. No liners are used and, during the rainy season, mold is often present on the fish by the time it reaches the large markets from the point of production. In Manila, the molded fish are washed and redried to remove the mold before it goes to the retailer.

Still another salt product is made from mackerel and sardines about six inches long. The fish are put in a concentrated brine solution for 12 hours, after which they are allowed to drain overnight. The following morning, they are salted with coarse dry salt and marketed with crystals of salt surrounding them. This is the product referred to as "kench-cured" or "balbakua" in Table 4.

Small anchovies, two to three inches long, are dried without salting when weather conditions permit. Elimination of salt is claimed to result in a product with a longer keeping period—the salt having a tendency to take up moisture.

In the Sulu Archipelago, large snappers and similar fish are cut to lay out flat and then cut through so that the finished product has a net-like appearance. These fish are dried aboard the small fishing boats as they are caught, being occasionally dipped in sea water during the process of drying.

Shrimp paste is another important product, it being particularly popular in the Visayan Islands, just south of Luzon. A typical method of preparation is to mix small shrimp with salt in the proportion of five parts of shrimp to four parts of salt, after which the shrimp is put in bags and pressed with heavy weights until brine no longer drains freely. The shrimp paste is spread out on mats in the sun until partially dry, then put in a wooden trough and mixed with two or more parts of salt (based on the original weight of shrimp). The mixture is trod upon by workers until thoroughly macerated, after which it is ready for packaging.

A substitute shrimp paste was seen in the Manila market made from ground salted fish and macerated cooked beans mixed in equal proportions by weight. The product was artificially colored to have the pink appearance of a good shrimp paste.

Patis

Patis, a clear, straw colored liquid, should also be classed as a salt fish product. The better grades are prepared from anchovies, goby fry, small shrimp, or gizzard shad which, after washing, are mixed with salt in approximately the same proportion as for the manufacture of bagoong, namely, one part by weight of salt to two or three parts of fish. The components are mixed and placed in large wooden cylindrical vats, concrete tanks, or earthenware jars. The mixture is allowed to ferment for six to eight months. The liquid is then allowed to drip from a spigot placed near the bottom of the vat. It is collected, aged in the sun, or brought to a boil and cooled for a few minutes, bottled in 12-ounce soft drink bottles, stoppered with a cork, labeled, and shipped to the market. The residue after draining off the liquid is again mixed with salt and after standing, results in a second grade product. This process may then be repeated two more times before the solids are discarded.

FIG. 8 - FISH DRYING YARD, NAVOTAS, SHOWING DRYING RACKS IN REAR, FISH BRINING TANK IN LEFT FOREGROUND, AND 50-GALLON OIL DRUM CONTAINING FISH PASTE IN RIGHT FOREGROUND.

The protein content of patis as determined in the Program Laboratory was found to be 9.5 percent for the first grade; 8.5 percent for the second; 3.5 percent for the third; and 0.3 percent for the fourth. The salt content of four samples determined as chloride and calculated as sodium chloride was found to be from 29 to 34 grams per 100 milliliters which would indicate that the patis is practically a saturated solution of salt.

Filipinos cook their rice without salt and the patis, therefore, serves not only as a condiment but as a source of salt. A high grade patis would also contribute some protein or protein breakdown products to the diet.

Smoked Fish

The only smoked product marketed in any quantity in the Philippines is called "tinapa." Mullet, gizzard shad, sardines, five to six inches in length, are washed but not eviscerated, put in a concentrated brine for one-half hour, then cooked in a saturated brine solution until the eyes fall out--usually about five minutes.

The fish are then drained and spread in the sun to dry, after which they are neatly arranged in rows on circular trays 16 inches in diameter which hold 100 fish. The smoking chambers consist of large earthenware jars or concrete furnaces

three feet deep. From 5 to 40 of these chambers are found in each factory. Glowing charcoal is placed in the bottom of the jar and hardwood sawdust is sprinkled over the charcoal to provide the smoke. Two trays of fish are put over each opening and their position changed from top to bottom once during the process. At the plant visited, the fish were smoked for 1½ hours, but it is reported that in some cases, the smoking may be for as long as 10 hours, the latter being used for fish to be held a longer period of time.

In the Manila area, the smoked fish are taken to market in the trays in which they were smoked. They are ordinarily sold within 24 hours after smoking and the baskets returned to the processor. The producer gets $1.75 a hundred for the fish and they retail at $2.25 or more a hundred.

CANNING

Prior to the war, the major fish-canning operation in the Philippines consisted of a tuna canning plant in Zamboanga on Mindanao Island; a plant for the canning of bangos in Capiz on Panay Island which was just completed in 1941; a pilot plant operated by the Bureau of Fisheries at Estancia on Panay; and a factory at Madridejos in Cebu which canned sardine, mackerel, and bonito.

FIG. 9 - VIEW OF FISH DRYING AT NAVOTAS SHOWING THE FISH SPREAD OUT ON TRAYS.

All these plants were destroyed during the war and it is not known when their reconstruction will be accomplished, if at all. The laboratory canning plant operated by the Program and a similar one by the Philippine Institute of Fishery Technology are, therefore, the only places where studies on canning of fish are now being conducted. The National Development Company, a government-sponsored operation, has equipment for a cannery in storage, but is waiting until the price of fish is reduced before installing it for production.

A large pineapple cannery, a branch of a California packing corporation, at Bugo on Mindanao Island, would be in a position to pack fish if a large enough supply were found to justify such expansion.

A note of encouragement for the canning industry is a recent item in a Manila newspaper to the effect that one of the large United States can manufacturing companies is planning to establish two can factories in the Philippines; one to service the Philippine Packing Corporation and another in the vicinity of Manila. A can company representative pointed out, that on the basis of present United States prices, paint cans could be supplied in Manila for one-fourth the price that is now being charged. Presumably, the price on food cans could be correspondingly decreased and would be an incentive to the development of canned fishery products.

FILIPINO DIET

The diet of the common Filipino laborer is unbalanced. He eats too much rice and not enough meat, fish, fruit, and vegetables. Tables 5 and 6 show the nutritive

Table 5 - Nutritive Value of Philippine Fishery Products1/

Item	Number of Analyses	Edible Portion	Proteins	Fats	Carbohydrates (N.F.E.)	Fuel Value per kilogram2/
		percent	percent	percent	percent	calories
Anchovy, dilis (Stolephorus commersonii)	2	72.36	16.91	0.74	0.38	760
Anchovy, dilis, dry	2	-	63.33	1.63	0.98	2720
Aschos (Sillago sihama)	1	47.35	18.59	5.67	0.66	1280
Catfish, hito (Clarias batractus)	1	56.51	17.66	4.75	0.09	1140
Catfish, kandule (Arius manillensis)	2	47.03	17.38	0.81	0.46	790
Catfish, kandule, mature	1	-	16.45	-	-	-
Cavalla, talakitok (Caranx armatus)	2	51.64	19.97	3.46	-	1110
Caesio, dalagang bukid (Caesio chrysozonus)	2	58.97	20.20	1.78	-	970
Caesio, dalagang bukid, (Caesio caerulaureus) blacktail, dry	1	-	66.50	8.65	0.06	3440
Climbing perch, marteniko (Anabas testudineus)	1	44.56	18.56	5.11	-	1200
Eel, swamp, palos (Synbranchus bengalensis)	1	50.59	17.78	0.54	-	760
Flat head, sunog (Platycephalus indicus)	2	49.23	19.72	0.99	-	880
Flounder, dapa (Pseudorhombus oligodon)	1	52.00	19.98	0.97	1.08	930
Gizzard shad, kabasi (Anodontostoma chacunda)	2	51.34	19.68	3.00	0.19	1070
Goby, bia (Glossogobius giurus)	2	49.51	17.69	1.45	0.01	840
Grouper, lapulapu (Anyperodon leucogrammicus)	1	-	20.22	0.69	1.04	910
Grunt, ayungin (Therapon plumbeus)	2	42.93	18.64	0.82	-	820
Halfbeak, buguing (Hemiramphus georgii)	1	60.44	20.56	1.24	-	930
Hairtail, espada (Trichiurus haumeala)	1	-	33.69	4.28	0.54	1750
Herring, immature, silinisi (Sardinella fimbriata)	1	-	19.13	2.63	0.22	1010
Mackerel, hasa-hasa (Rastrelliger brachysomus)	1	53.29	22.83	1.95	0.32	1100
Milkfish, bangos (Chanos chanos)	2	69.08	20.32	4.52	-	1220
Majarras, malakapas (Gerres filamentosus)	1	41.49	21.01	2.02	0.18	1030
Mudfish, dalag (Ophicephalus striatus)	1	85.00	16.95	0.48	1.48	780
Mullet, young, talilong (Mugil melinopterus)	1	30.00	20.15	2.65	-	1050
Porgy, bakoko (Sparus berda)	2	49.48	20.42	1.27	0.34	950
Sardine, tamban (Sardinella logiceps)	2	45.99	19.17	2.66	-	1010
Sea bass, apahap (Lates calcarifer)	2	56.28	20.35	1.81	0.51	1000
Slipmouth, sapsap (Leiognathus equulus)	1	41.80	19.23	0.54	-	820
Snapper, red, mayamaya (Lutjanus malabaricus)	1	-	18.14	7.42	0.54	1420
Spade fish, kiteng (Scatophagus argus)	2	42.76	17.85	4.44	1.28	1170
Spanish mackerel, tanguingi (Cybium commerson)	1	-	20.36	2.67	-	1060
Surgeon fish, labahita (Acanthurus bleekeri)	1	76.05	19.19	3.75	1.34	1160
Tarpon, buan-buan (Megalops cyprinoides)	1	50.00	18.96	4.19	-	1140
Therapon, bagaong (Therapon jarbua)	1	50.00	19.72	2.48	-	1010
Tuna, tulingan (Euthynnus yaito)	1	55.93	23.91	1.77	0.19	1120
Salted, dried, and smoked fishes:						
Herring, tinapa, tunsuy (Sardinella fimbriata)	3	-	40.60	2.80	0.47	1900
Herring, tuyo, tunsuy	2	-	41.36	3.92	0.98	2050
Milkfish, bangos	1	-	30.29	3.84	-	1560
Slipmouth, sapsap	1	-	45.64	2.46	-	2050
Mullet, young, talilong	1	-	37.44	6.24	-	2060
Fish and crustacean byproducts:						
Bagoong alamang	1	-	10.38	1.15	0.71	550
Bagoong Ilocano	1	-	12.94	0.98	0.68	630
Bagoong Visaya	1	-	17.88	0.43	1.67	820
Patis Cavite:						
First class	1	-	6.69	0.57	0.44	340
Second class	1	-	2.52	0.29	1.04	170
Third class	1	-	2.67	0.71	1.22	220

1/ From A Handbook of Philippine Agriculture, College of Agriculture, University of the Philippines, 1939.
2/ Kilogram = 2.2 pounds.

value of Philippine fish and fishery products and the mineral content. Since fish is a good source of proteins, the development of the fisheries is very important to the people of the Republic of the Philippines.

COMMENTS

Observations of the Philippine fisheries for a period of nine months has led to the following conclusions as to current conditions and efforts that should be made to improve them.

With regard to the catch of fish for the fresh market, intensive fishing efforts are made in some areas, while other areas, with a large potential supply

of fish, are relatively unexploited. For example, the comparatively restricted Manila Bay grounds are heavily fished by beam trawlers, whereas, in the more productive southern areas, small sailing craft with hand lines comprise the major part of the fishing fleet.

Table 6 - Minerals Found in Philippine Fishery Products[1/]

Item	Calcium	Phosphorus	Iron
	percent	percent	percent
Anchovies, dilis (stolephorus sp.), dried	2.866	2.568	-
Bagoong alamang, Cavite Zamboanga	0.457	0.262	-
Bagoong dilis, salted and fermented anchovies (stolephorus sp.):			
Cavite	0.136	0.118	-
Iloco	0.064	0.349	-
Bagoong itlog ng bangos, salted and fermented eggs of milkfish (Chanos chanos)	0.036	0.445	-
Bass, apahap (Lates calcarifer)	-	-	0.0003
Brill (Pseudorhomus sp.)	0.020	0.200	0.0010
Catfish, kandule (Arius sp.)	-	-	0.0004
Clams, average	0.314	0.162	-
Bototoy	0.114	0.179	-
Hala-an	0.407	0.247	-
Luna, brown	0.422	0.118	-
white	0.400	0.170	-
Lucan	0.450	0.100	-
Dry-salted grunt, daing ayungin (Theragon plumbeus)	4.423	2.419	-
mudfish, dalag (Ophicephalus striatus)	1.043	0.943	-
catfish, kandule (Arius sp.)	0.300	0.782	-
Gizzard shad, cabase (Anodontostoma chacunda)	-	-	0.0005
Herring, siliniasi (Sardinella fimbriata)	-	-	0.0006
salted and smoked, tinapa	2.140	0.363	-
Heko, solid residue from the manufacture of "patis"	0.143	0.747	-
Hibe, shrimp (Penaeus sp.), dried and with skin removed	0.033	0.489	-
Lobster	0.018	0.188	0.0009
Milkfish, bangos (Chanos chanos)	0.026	-	-
Mudfish, dalag (Ophicephalus striatus)	0.019	-	-
Mullet, average	0.114	0.268	-
salib	0.127	0.086	-
talilong	0.100	0.450	-
Oyster	0.052	0.155	0.0045
Paltat, hito (Clarias batrachus)	0.009	-	-
Patis alamang, Cavite	0.014	0.009	-
Perch, alalo (Anabas testudineus)	0.013	-	0.0005
Red snapper, mayamaya (Lutjanus malabaricus)	-	-	0.0004
Sardine, tamban (Sardinella longiceps):			
salted and sun dried, tuyo	0.058	-	-
smoked, tinapa	0.063	-	-
Slipmouth, sapsap (Leiognathus equulus)	0.060	-	-
Shrimp (Penaeus sp.)	0.096	0.292	0.0027
salted, maalat	2.337	0.009	-
Spanish mackerel, tanguinguai (Cybrium commerson)	-	-	0.0008
Tulá	0.114	0.162	-
Turbot, dapa (Psettodes erumei)	-	-	0.0007
Tuna, tulingan (Euthynnus taito nouye)	0.030	0.300	0.0015

1/ From A Handbook of Philippine Agriculture, College of Agriculture, University of the Philippines, 1939.

These fishermen in the southern regions have sufficient gear to catch many more fish than are now being taken, but lack of a market in the more remote regions of the Islands discourages more intensive fishing. One of the solutions to the better utilization of this possible source appears to be an operation such as is being carried on by the YP "reefer" ship described previously. Strategic location of freezing storage plants in places having good fish supply is a possible method of working with refrigerated carriers and is practiced by the owner of the YP. Use of small multi-purpose fishing boats of about 50 feet in length with adequate refrigeration or icing facilities would also aid in making better use of the fishery resources in remote regions. Plans are under way to get a ship of this type for use by the Philippines' Fishery Program and a study of its operation should provide important information relative to a more equitable use of fish supply.

In the absence of adequate means of distributing fresh fish, salting and drying of the catch must be resorted to in order to preserve the catch for delivery to distant markets. The salting and drying procedures used are crude, and, according to the United States standards, are, in many instances, unsanitary. The salt used is produced in the Philippines, for the most part by the solar evaporation process, and has a higher calcium and magnesium content than that produced by the solar process in California. One of the projects of the Technological Section is to determine if it is feasible to produce a purer salt by slightly modifying the procedure now in use. It is believed that the quality of the salted products could thereby be improved.

FIG. 10 - PRODUCTION OF SALT BY THE SOLAR EVAPORATION PROCESS.

Brine salting of fish has been considered as a process that would keep fish in better condition than dry salting as now practiced. Investigation showed, however, that brine salted fish shipped here shortly after the war was not well received, the objection being that the soaking before use to decrease the salt content was an extra preparatory procedure that was not liked by the Filipino housewife.

The contribution the Philippine Fishery Program can make to the salt fish industry will be extension work to (1) improve the methods of salting and drying, particularly with respect to sanitation, and (2) to devise means of getting the product to the market in better condition through improved packaging and transportation. The Philippines' Bureau of Fisheries had started such a program prior to the war and found the people interested in demonstrations aimed to improve the quality of the product and production efficiency.

It is anticipated that canning of fishery products on a commercial scale will not start for at least a year or until the price of fish is substantially reduced and a reasonably priced supply of cans is available. However, the Technological Section personnel have been canning the types of fish considered as possibilities for a practical operation. Data on the use of different oils, sauces, and brines are being obtained so that information will be available for interested parties. Samples from all lots are being held for storage studies.

The fish oil and reduction business is practically non-existent in the Philippines at present. Reduction of fish meals and oils is precluded by high value of fish for the fresh market, by the lack of processing plants, and by difficulty in obtaining waste for reduction purposes. There is a large potential demand for fish meal and studies are to be made on the various species which might be available for reduction.

There have been attempts to start a fish liver buying business in the Islands, but the high price of market fish and the scattered sources of supply have pre-

vented any profitable operation to date. The possibility of exploiting the shark industry is currently being investigated. One of the Program boats is surveying the shark fishing potentialities of the Sulu Archipelago area, which is reported to be one of the good localities. Determinations of vitamin A potency and oil content of the livers of sharks will be made and studies will also be conducted on the value of the byproducts, including the skins, fins for soup, and flesh for food or reduction use. Small sharks are sold in the Manila markets for food, but the Filipinos have an aversion to eating large sharks. However, in the Moro country around Mindanao, large sharks are steaked and sold by the piece with a slice of the liver thrown in, the latter being cooked with the meat to make it more "juicy."

Trepang, or beche de mar, a product consisting of the dried bodies of sea cucumbers (echinoderms of the family Holothuriidae) was formerly an important export article from the Philippines. The principal market was China, but the Chinese placed an embargo on trepang last year, considering it a luxury item. Consequently, the trepang business is at a standstill now. Prior to the embargo, 50 tons a month were shipped out of Jolo to Manila, the price received being between 18 cents to 45 cents a pound, depending upon the quality. No first hand observation of the processing of trepang has been done by Program personnel; however, it is planned that a study will be made with a view to improving the quality of the item in preparation for the time when an export business is once more developed.

No data are available as to the extent of the shellfish industry in the Philippines, but there are numerous edible molluscs found here of which oysters are the most important. The Manila Bay area is one of the potentially important oyster-producing areas, not only because the waters are conducive to growth, but because of the proximity to a large market. Unfortunately, it has been found by the Program bacteriologist that oysters and the overlying waters from two oyster-producing areas, one 10 miles to the north, and one 15 miles to the south of Manila, are polluted. The report on the subject is being submitted to the Philippine Bureau of Fisheries and it is hoped that a satisfactory solution to the problem may be worked out in the future.

Another interesting shellfish which grows on the bottom in some oyster-producing regions is the window shell or "Kapiz" (Placuma placeta Linn). It has two shells about six to eight inches in diameter resembling thin wafers, one shell being almost flat while the other one has a slight curvature. The flatter part of the shell is trimmed 2½ to 3 inches square and each piece is used as a section in the manufacture of windows made up of numerous sections. The shell is also used to make lamp shades and other decorative articles. Meat from the Kapiz is palatable, although the orange color makes it unattractive in appearance.

Mother-of-pearl and trocha shells are important marine products exported in quantity. In 1947, 795,485 pounds of mother-of-pearl and 1,578,150 pounds of trocha worth $375,020 and $259,456, respectively, were shipped out of the country.

It can be seen from the foregoing that there is an opportunity for the Philippine Fishery Program, in cooperation with the Philippine Bureau of Fisheries, to render material assistance to the fishing industry. The Filipinos are interested in learning the best methods of doing things and it is up to the personnel in the Program to give them the information and instruction.

An outstanding example of the interest shown is the number of people coming to the Program office in response to a press release about otter trawling. As a

result, one owner has already placed an order for otter trawl gear to put on his new fishing boat. Another man who is converting 5 Coast Guard boats for fishing has been getting data with the intent to install the equipment on his fleet.

Such examples represent concrete cases of a contribution toward rehabilitation and it is the intent of the Program to arouse still more interest in other phases of the fisheries with a view to developing them to the greatest extent commensurate with good conservation.

* * *

Republic of the Philippines[1/]

Length Equivalents		Area Equivalents	
1 kilometer	= 0.6214 miles	1 hectare	= 2.471 acres
1 pié	= 0.927 feet	3,577.000 brayas cuadradas	= 1 hectare
1 pulgada	= 12 lineas	35.770 loanes	= 1 "
1 "	= 0.927 inches	3.577 balitas	= 1 "
1 varas	= 2.782 feet	0.3577 quiñon	= 1 "

Volume & Capacity Equivalents		Mass Equivalents	
1 ganta	= 8 chupas	1 picul	= 63.25 kilograms
1 "	= 2.71 U.S. quarts	1 arroba	= 25.36 pounds avoir
1 cavan	= 25 gantas	1 quintal	= 46 kilograms
1 "	= 67.75 U. S. quarts	1 "	= 4 arrobas
		1 "	= 0.1 tonne
		1 tonne	= 1.1023 U. S. tons

1/ From A Handbook of Philippine Agriculture, College of Agriculture, University of the Philippines, 1939.

SMOKING SHRIMP

Smoking shrimp is a simple process, and the smoked product is so tasty and eye-appealing that an assured demand may be expected in spite of the slightly increased cost.

Long ago, fish and shellfish were smoked principally to preserve them for extended periods of time. As the process of smoking developed and improved, smokers found that fish and shellfish could be smoked lightly for added flavor and color. This discovery was a factor in the development of specialty products--commodities whose qualities are improved or whose value is otherwise enhanced by processing. Thus, in addition to the use of smoking as a means of preservation, its employment has been expanded to add "taste" to fishery products.

--Fishery Leaflet 312

THE INDO-PACIFIC FISHERIES COUNCIL

By A. W. Anderson*

The need for cooperation and coordination in fisheries research concerned with the resources of the sea has been recognized for years. A number of European nations have long been organized in an association active particularly in the Northwest Atlantic and known as the Permanent International Council for the Exploration of the Sea. Canada and the United States have cooperated somewhat similarly on a bilateral basis in establishing an International Fisheries Commission and a Pacific Salmon Fisheries Commission, each with regulatory powers, to preserve their halibut and salmon resources on the Pacific Coast.

Proposals to establish fishery councils patterned after the Permanent Council for the Exploration of the Sea were discussed at the First Session of the Conference of the Food and Agriculture Organization at Quebec in 1945. In 1946, at the Second Session in Copenhagen, the report of the Standing Advisory Committee on Fisheries recommending the establishment of such councils was approved. Early in 1947, the South East Asia Fisheries Conference at Singapore, under the auspices of the United Kingdom Special Commissioner in South East Asia, resolved that the Food and Agriculture Organization be requested to establish a Fisheries Council in that area. Later in 1947, the Director-General of FAO notified Member Nations of his intention to place the matter of initiating Fisheries Councils on the agenda for the Third Session of the Conference of FAO at Geneva. A suggested draft of a constitution for a Regional Council was circulated, and, in September 1947 at Geneva, the Conference resolved

> "that FAO should take action to initiate the formation of Regional Councils for the scientific exploration of the sea in the parts of the world not now actively served by similar bodies, giving primary consideration to the following areas:
>
> North Western Atlantic
> South Western Pacific and Indian Ocean
> Mediterranean Sea and contiguous waters
> North Eastern Pacific
> South Eastern Pacific
> Western South Atlantic
> Eastern South Atlantic and Indian Ocean
>
> "This Commission is of the opinion that the boundaries of these areas, and the constitutions of the councils, should be left open for discussion and determination by the nations concerned."

All Member Governments of FAO were notified in November 1947 of the proposal to establish a Regional Council for the Study of the Sea in the South Western Pacific and Indian Oceans. In January 1948, invitations to convene in Baguio, Philippines, for this purpose from February 23 to 28, 1948, were sent to the Governments of Australia, Burma, China, France, India, Netherlands, Pakistan, Philip-

* Chief, Branch of Commercial Fisheries, U.S. Fish and Wildlife Service, Washington, D.C., U.S. Delegate to the FAO Regional Meeting to Consider the Formation of a Regional Council for the Study of the Sea, Baguio, Philippines, February 23-28, 1948.

NOTE: Adapted from article of same title by A. W. Anderson in The Department of State Bulletin dated July 4, 1948.

pines, Siam, United Kingdom, and the United States. Invitations were also issued to UN, UNESCO, WHO, ILO, SCAP, and the Permanent International Council for the Exploration of the Sea.

At the Baguio Conference, delegates were present from Burma, China, France, India, Netherlands, Philippines, United Kingdom, and the United States. Observers were present from Italy, SCAP, and UNESCO. FAO was represented by the Regional Special Advisor, the Director and the Chief Biologist of the Fisheries Division, and the Regional Representative (Fisheries) from Singapore.

Nearly all the delegates, advisers, and observers were technical fisheries representatives of their Governments. A few were from allied fields while one United States representative was a member of two international fisheries commissions and an attorney well versed in international fisheries law.

The Fisheries Conference began with a Joint Opening with the Nutrition Conference which was meeting in Baguio at the same time, and terminated its work with a similar Joint Closing at which matters of mutual concern were discussed.

The Fisheries Conference organized promptly by electing officers and establishing seven committees. Dr. D. V. Villadolid, Director of Fisheries, Bureau of Fisheries, Manila, Republic of the Philippines, and Dr. L. G. M. Baas Becking, Director of the Botanical Gardens in Buitenzorg, Java, served ably as Chairman and Vice-Chairman, respectively. The Credentials Committee also was headed by Dr. Becking, the Steering Committee by U. Khin of Burma, and the Drafting Committee by Dr. S. L. Hora of India. The four continuing technical working committees had chairmen as follows: Biology, Dr. G. A. C. Herklots, United Kingdom; Hydrology, Dr. Becking; Taxonomy, Dr. Hora; and Technology, Dr. Villadolid.

The formal agenda of the Conference was limited, after some discussion, to the establishment of a Fisheries Council for the Indo-Pacific area and the development of the scientific program to be carried on by that Council. Consequently, the conference was able to concentrate upon these objectives and, within the relatively brief time allotted for its deliberations, to formulate an agreement for the establishment of the Indo-Pacific Fisheries Council and to evolve a comprehensive program of investigations to be undertaken by the Council during the next several years.

Development of the final document began with consideration of the draft constitution proposed by the FAO, the comments and suggestions in the opening statements of the various delegations, and the modified agreement submitted by the United States.

From these deliberations, an Agreement for the Establishment of the Indo-Pacific Fisheries Council emerged. The representatives of Burma, China, France, India, Netherlands, Philippines, United Kingdom, and the United States recommended to their respective Governments for consideration the acceptance of the Agreement.

The Agreement recognizes a "mutual interest in the development and proper utilization of the living aquatic resources of the Indo-Pacific Areas" and provides for the establishment of a Council with certain functions and duties in the Indo-Pacific areas. These functions and duties are:

1. To formulate the oceanographical, biological and other technical aspects of the problems of development and proper utilization of living aquatic resources.

2. To encourage and coordinate research and the application of improved methods in every day practice.

3. To assemble, publish or otherwise disseminate oceanographical, biological and other technical information relating to living aquatic resources.

4. To recommend to member Governments such national or cooperative research and development projects as may appear necessary or desirable to fill gaps in such knowledge.

5. To undertake, where appropriate, cooperative research and development projects directed to this end.

6. To propose, and where necessary to adopt, measures to bring about the standardization of scientific equipment, techniques and nomenclature.

7. To extend its good offices in assisting member Governments to secure essential materials and equipment.

8. To report upon such questions relating to oceanographical, biological and other technical problems as may be recommended to it by member Governments or by the Food and Agriculture Organization of the United Nations and other international, national or private organizations, with related interests.

9. To report annually to the Conference of the Food and Agriculture Organization of the United Nations upon its activities, for the information of the Conference; and to make such other reports to the Food and Agriculture Organization of the United Nations on matters falling within the competence of the Council as may seem to it necessary and desirable.

Other articles in the Agreement provide that each Member Government shall be represented at Council meetings by a single delegate, that the seat of the Council shall be at the FAO Regional Office most conveniently situated in the Indo-Pacific areas, and that the FAO shall provide the Secretariat and appoint the Council's Secretary. The expenses of research or development projects are to be determined and paid by the Governments involved.

The Agreement is open to acceptance by the Governments represented at the Baguio Conference, by other Governments which are members of FAO, and by those Governments not members of FAO which meet certain conditions including approval by the Conference of the FAO and by two-thirds of the Members of the Indo-Pacific Fisheries Council. The Agreement shall enter into force upon the date of receipt of the fifth notification of acceptance. The United States reserved its position with regard to the Agreement entering into effect without referral to the next Conference of the FAO because certain provisions appeared to require further Conference approval.

In order that the scientific cooperation begun at Baguio might continue, it was resolved by the Fisheries Conference that the technical working committees on Biology, Hydrology, Taxonomy, and Technology should continue to function informally, with the assistance of the Fisheries Division of FAO, pending the entry into force of the Agreement.

The Committee on Biology recommended that the mode of approach to a program must be by way of determining the present status of knowledge and the programs under way in the area. It proposed as a first step the circularization of a questionnaire on these matters and an analysis of the replies.

The Committee on Hydrology envisaged a five-year program, involving, in the first year, the compilation of oceanographic data, drafting of a map of the principal producing regions, agreement on methods and procedures, appointment of an oceanographer on the staff of the FAO Fisheries Division, and compilation of a list of available research vessels which could be drawn upon for assistance.

For the second year, consideration of the establishment of an observational pattern based upon the knowledge accumulated is suggested. For the third, fourth, and fifth years, initiation of a coordinated program of hydrographic observations was proposed.

The Committee on Taxonomy suggested an exploratory program during the first year. It recommended definition of the limits of the region; examination of existing facilities; expansion of an existing institution to house and maintain standard international collections of regional aquatic organisms; development of ways and means of completing national collections in each taxonomic subregion; preparation of a bibliography of the most important taxonomic works published about the region during the last 25 years; development of coordination between existing taxonomic laboratories and research laboratories; and establishment of coordination in taxonomic studies between the proposed Council and international bodies such as International Commission for Zoological Nomenclature and UNESCO.

Collection and codification of information would occur during the second year. It would include preparation of check lists of aquatic organisms, area by area, and of commercially important groups of animals, family by family; preparation of handbooks of commercially important fishes of each economic area; and initiation of studies in racial or other fragmentation of species or stocks.

Publication and collection of material was suggested for the third year. The second year's results would be edited and published; maps showing zoogeographical and seasonal abundance of species would be prepared and published; and expeditions would be organized to collect and study aquatic fauna with particular reference to ecology.

Continuation of activities during the fourth and fifth years would include repeating the programs of the second and third years for different areas and different groups of aquatic animals.

The Committee on Technology reported that a final program could be developed only after a specific program had been submitted to government representatives for their comments and inclusion of the technological requirements of their countries. The value of an Indo-Pacific Fisheries Technological Institute was acknowledged, but it was not assigned a definite position in the program because it was not apparent that one central institute was preferable to a number of smaller centers, nor was it certain that its importance was greater than several other suggested projects.

Establishment of the Indo-Pacific Fisheries Council now awaits receipt of the five notifications of acceptance by the Director-General of the FAO.[1/] At the

1/ The Governments of France and the Philippines have notified the Director-General of their acceptance of the Agreement.

Second Session of the Council of FAO in Washington, April 5 to 17, 1948, the Report of the FAO Baguio Fisheries Conference was accepted. Shortly thereafter, in a Circular Letter to Member Governments, the results of the Conference at Baguio was called to their attention by the Director-General and early acceptance of the Agreement urged.

Within six months after entry into force of the Agreement, the first meeting of the Indo-Pacific Fisheries Council is to be called by FAO at a place it shall designate.

LIST OF DELEGATES

Burma

U Ka Si
Financial Commissioner
Rangoon

Bo Pe Aung
Member of the People's Volunteer Organization
Rangoon

U Khin
Senior Deputy Director of Agriculture, Lower Burma
Rangoon

China

Dr. Liu Fah Hsuen
Director, Department of Fisheries
Ministry of Agriculture and Forestry
Nanking

France

Mr. R. Serene
Director of Oceanographic Institute
Indo-China, Nha Trang

Mr. P. Lencouvel
Member, French Economic Mission in the Far East
Paris

India

Dr. S. L. Hora
Director of the Zoological Survey of India, Benares

Netherlands

Dr. L.G.M. Baas Becking*
Director, Botanical Gardens
Buitenzorg, Java

Dr. J.K. de Jong
Officer - Institute Sea Fisheries
Makassar, East Indonesia

Dr. J.D.F. Hardenberg
Head of the Laboratory for Investigation of the Sea
Java

Mr. P. W. Lokollo
Fisheries Technologist
East Indonesia, Makassar

Philippines

Dr. D.V. Villadolid**
Director, Bureau of Fisheries
Department of Agriculture and Natural Resources
Manila

Mr. Claro Martin
Chief, Division of Fisheries Technology
Bureau of Fisheries, Department of Agriculture and Natural Resources
Manila

*Vice-chairman of the conference.

**Chairman of the conference.

United Kingdom

Dr. W. M. Clyde
Food Adviser, Special Commissioner
in South East Asia
Singapore

Dr. G.A.C. Herklots
Secretary for Development
Colonial Secretary's Office
Hong Kong

Mr. J. A. Tubb
Fisheries Officer
Colony of North Borneo
Sandakan

United States of America

Mr. A.W. Anderson (Delegate)
Chief, Division of Commercial Fisheries
U.S. Fish and Wildlife Service
Washington 25, D. C.

Mr. C.J. Shohan (Alternate Delegate)
Advisor on Food and Agricultural
Programmes, Department of State
Washington, D. C.

Mr. E. W. Allen (Advisor)
Vice-Chairman of Pacific Fisheries
Conference
Seattle, Washington

Mr. O.E. Sette (Advisor)
Chief, South Pacific Investigations
U.S. Fish and Wildlife Service
Stanford University, California

Mr. H.E. Warfel (Advisor)
Biologist-in-Charge
Biological & Oceanographic Investigations
Philippine Fishery Programme
U.S. Fish and Wildlife Service
Manila

Mr. T. MacClure (Advisor)
Advisor Fisheries
U.S.A. Military Government in Korea

Observers:

Italy

Dr. V. Strigari
Charge' D'Affaires
Italian Legation, Manila

ORGANIZATIONS

Supreme Commander for the Allied Powers (SCAP)

Mr. W.C. Herrington
Chief of Fisheries Division
Natural Resources Section
GHQ - S.C.A.P. - Tokyo

United Nations Educational, Scientific and Cultural Organization (UNESCO)

Mr. S.N. Dasgupta
Counsellor to UNESCO, Paris

Food and Agriculture Organization (FAO)

Sir Pheroz Kharegat
Regional Special Advisor

Dr. D.B. Finn
Director of Fisheries Division

Dr. J. L. Kask
Chief Biologist, Fisheries Division

Mr. G. L. Kesteven
Regional Representative
FAO (Fisheries)
Singapore

THE FISHERIES AND FISHERY RESOURCES OF MEXICO[1/]

By M. J. Lindner*

In recent months, all of us have been reading vivid and picturesque accounts of the vast fishery potentiality of Mexico and the unlimited possibilities of utilizing and expanding these resources. From these accounts, it would appear that the waters about Mexico were teeming with fishes and all one need do to become a millionnaire is to buy a fish net. However, when we examine the situation more carefully, we find that it may not be as portrayed, and we also find that there appear to be certain fundamental problems that must be solved before Mexico can expect to increase her fishery production much beyond that which she is producing today.

I wish to call attention to certain facts, ideas, and possibilities which seem to me to have been overlooked or to which insufficient attention has been paid. My purpose is to stimulate thought and discussion with respect to the fisheries of Mexico, along certain lines that appear to have become lost in a maze of recent publicity. I should like it clearly understood that the remarks I make herein are strictly my own personal ones and in no way do they represent or reflect the views of the U. S. Fish and Wildlife Service, nor those of the Dirección General de Pesca e Industrias Conexas.

In the broad biological usage, the term "fisheries and fishery resources" of a country generally includes those fisheries and fishery resources of the high seas as well as those confined within the narrow territorial limits defined by international law. I am using this term in the biological rather than in the international-law sense, which determines the limits of ownership. But there appear to be other limits to the fisheries and fishery resources of Mexico.

The extent to which a fishery may develop is limited. Any single fishery is limited by the magnitude of the fish population and by the available market for the fish.

In other words, we cannot have a fishery unless we have both fish and markets for those fish, and the extent to which any one fishery may grow is limited by the numbers of that fish that the waters can produce, and it is also limited by the amount of that fish which can be sold.

I shall deal mostly with fish populations, but before entering upon this topic, I shall make a few remarks about markets for fishery products.

There are two types of markets for fishery products; the foreign market and the local market. Of the two, the local market is the only certain market. It is the only market over which a country has complete control. The control of the foreign market lies largely in the hands of the importing country. At any time the importing country may place import restrictions such as quotas, or she may increase her import tariffs. Either of these actions conceivably could, almost overnight, wipe out a large fishery enterprise depending on a foreign market. As we all know, many of the major fisheries of Mexico depend entirely on foreign markets.

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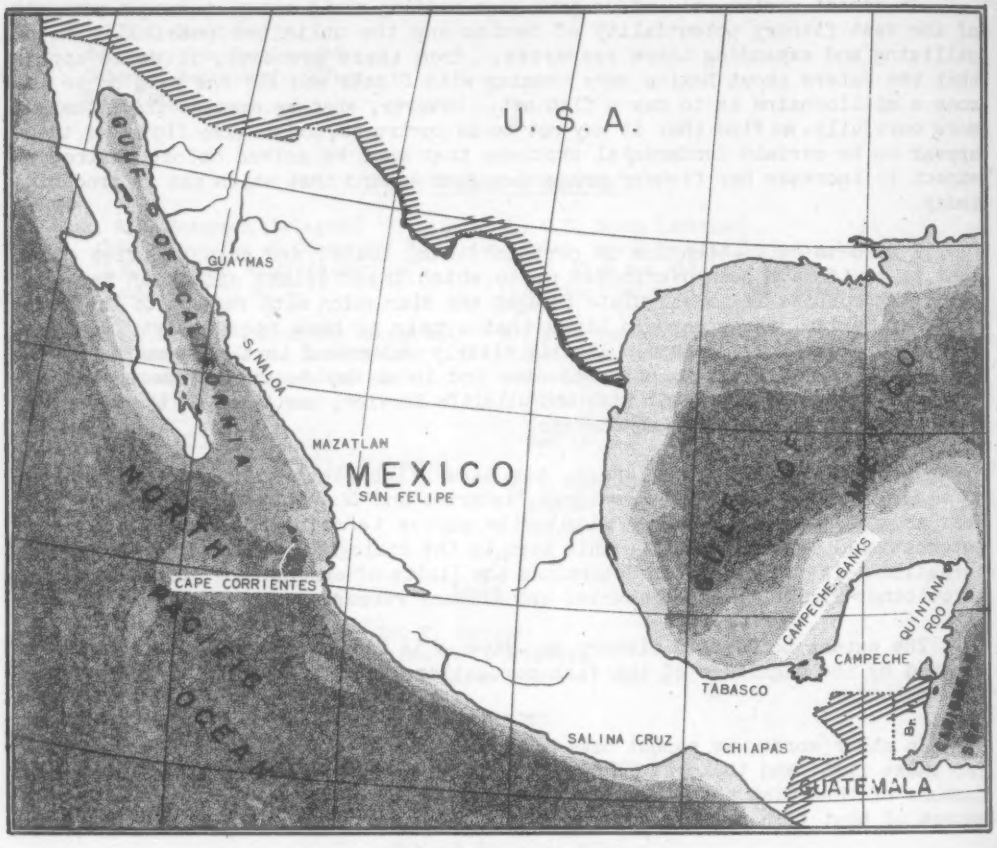
1/ A speech delivered in Spanish on June 10, 1948, at a seminar program of La Sociedad Mexicana de Historia Natural, Mexico, D.F., Mexico.

In Mexico, practically all of these export fisheries can be classed as luxury, and as we shall see later, it appears in many instances that these luxury fisheries are being utilized nearly to the maximum extent, but with little liklihood of other luxury fisheries being developed.



The Mexican local market is not yet highly developed and there appear to be many problems which must first be solved before appreciable changes will occur in this market. These will be mentioned later, so let us now turn our attention to the subject of the fish themselves.

First, let us start with the fundamental subject of fish food. Without large quantities of food we cannot have great numbers of fishes. From indirect evidence it appears that extensive areas of waters about the Mexican coasts do not produce food in quantities comparable to those portions of the globe where fish are extremely abundant. The old concept that the seas in higher latitudes are richer in fish than the tropical and subtropical seas, is no longer acceptable. Nor is it acceptable that phytoplankton[2/] is everywhere the basic food in the sea. However, we can still rely on the maxim that if we are to have an abundance of fish we must have an abundant supply of food for those fish. Now, from where does this fish food come?

2/ Plankton consisting of floating plant life.

Basically, this food comes from three general sources; from the phytoplankton, from detritus from decomposing phytobenthon,3/ and from detritus from the land. Considering first the phytobenthon, we find that nowhere along the coasts of Mexico is it abundant except along the west coast of Baja California. With this exception, we can disregard phytobenthon as an important food source in Mexican waters. We then have two remaining sources of food, phytoplankton and detritus from the land. Of these, we shall consider first the phytoplankton of the coastal waters.

Unfortunately, no adequate studies of the comparative abundance of phytoplankton have been made along the Mexican coast. Hence, we do not have a really accurate basis for determining the relative plankton productivity of these waters. We can, however, arrive at general conclusions by other means. One method is by the transparency of the water. Highly transparent water is not rich in plankton. Much of the coastal water near Mexico can be considered as being relatively transparent. Coming within this category are the Caribbean waters of Quantana Roo, the Gulf waters over the Campeche Banks, and most of the Pacific coastal waters south of Cape Corrientes.

Also, as a general rule, where plankton is abundant in coastal waters there are numerous large schools of plankton-feeding isospondylous fishes such as herring, sardines, and anchovies. So far as is known, only the waters north of Cape Corrientes have these types of fishes in quantities. Some of course, do occur in the Gulf of Mexico, but apparently they are not nearly so abundant as are the comparable forms of the northwest coast. With these brief statements, we shall leave the phytoplankton and consider the detritus from the land.

The detritus from the land comes from two sources; that brought down by the rivers and that formed by the decomposition of plants in the lagoons and in the marshes of the deltas. There is no way of distinguishing between the contributions of the rivers and that of the other sources, as generally the rivers terminate in either lagoons or marshy deltas, so no separation will be attempted of the land food sources. It is obvious though, that in Baja California, rivers can be of but little importance as a source of basic food. Likewise, the waters off the Yucatán peninsula cannot be supplied with any great amount of basic food from the land. On the other hand, food from the land, including the plankton of lagoons and marshes, seems to be the principal food source throughout much of the Mexican coast. Such important fishes as the mullets, the robalos, and the milkfish, are to a great extent dependent on this source of food, as are also the shrimps.

It is probable that food of land origin is more important in the Gulf of Mexico than that of any other origin. The same probably applies to eastern Oaxaca and to Chiapas. It undoubtedly also is important on the mainland in the region between Guaymas and Cape Corrientes. Important as the land in Mexico appears to be as a source of marine food, it probably does not compare with other sections of the world which are known to produce large quantities of fishes. A great part of Mexico has but little rainfall, there are but few important rivers, and there are not many sections with extensive marshlands.

It is also generally true that in coastal waters, bottoms of sand, shell, and coral are poor in detritus when compared to adjacent bottoms of mud and clay. Large stretches of the bottoms along the Mexican coasts have sand, shell, and coral bottoms. This is particularly true of the bottoms near the Mexican coast in the Gulf of Mexico and the Caribbean Sea.

3/ Plant life in or upon the sea bottom.

Taking all of the foregoing into consideration, it is probable that the richest waters about Mexico are those around Baja California. It is also probable, because of the lack of basic food, that the actual pounds of marine life per unit area in the waters and sea bottoms throughout the Mexican coasts, will average considerably less than those of the North Sea or of the Grand Banks. By this, I do not mean that the waters about Mexico are poor in fish life. But I do mean that these waters are not necessarily rich in fish life, and that because Mexico has extensive coastlines on two oceans does not in itself warrant statements to the effect that Mexico has unlimited fishery resources, nor should the estimated production of these coastlines be compared to the production of those of the greatest fish-producing areas of the world. The fishery resources in the waters about Mexico are limited to the amount of basic food these waters can produce, and it does seem probable that this food is not particularly abundant over large areas of the coast.

Now, let us depart from the food problem and turn our attention to some of the more important fisheries in the waters about Mexico in order to see what conclusions we may arrive at with respect to them.

The greatest fishery by far of any in the waters about Mexico is that for the tunas along the west coast of Mexico, in particular, the waters surrounding Baja California. The tunas are primarily fishes of the high seas where, as is well known, they are not taken in appreciable amounts by Mexican fishermen, but on the contrary, almost all are caught by fishermen from the United States who return with their product to the canneries in San Diego and San Pedro, California. That the tunas are abundant is obvious from the catches, but there are those who believe the tunas may be undergoing depletion. At the present moment, Mexico is embarking on an enterprise to expand her tuna fisheries. It is probable that the extent of the success of this enterprise will depend upon various factors, such as: the continued abundance of the tunas, the degree to which Mexico can develop and maintain foreign markets, and the extent to which she can develop her own markets.

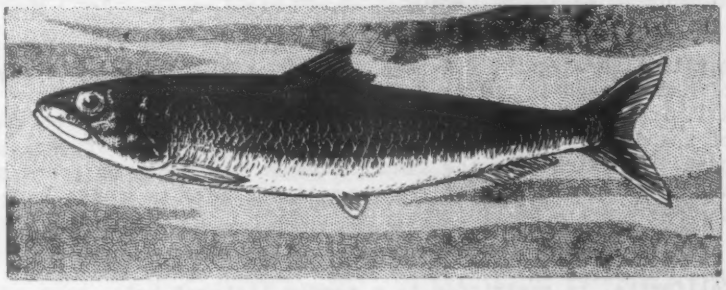
The next most important fishery is that for shrimp. This fishery appears to be limited in the amount that can be produced. Indications are that the shrimp fishery in the Gulf of California between San Felipe, Baja California, and Altata, Sinaloa, has already reached its maximum productivity and that future production in this area will depend upon the variations in the annual productivity of the shrimp. This is evident from the fact that in spite of the increasing numbers of boats entering this fishery, the total production of the fishery has increased but little in the past two seasons. At the same time, the average catch per day per boat has dropped considerably. On twenty-some boats for which we have continuous records, the average daily catch per boat during the 1946-47 season was but 43 percent of the average daily catch for these same boats during the 1945-46 season. We do not yet have the records for these boats for the 1947-48 season, but from all reports the average catches did not approximate the 1945-46 high. We do know, though, that still more boats entered this fishery during the past season, but that the total catch remained about the same as that of the previous season. It might be argued that the decline in average daily catches since the 1945-46 season is a result of migrations of the shrimp or of natural fluctuations in the shrimp supply rather than the fishery having reached its maximum productive potential. These explanations do not seem to be true, however, for the returns from preliminary tagging experiments we conducted in this area during the fall of 1945 indicated an intensive fishery even at that time.

Here again it seems that food may be the limiting factor--a coastline of about twice the length of that of the State of Louisiana, apparently can produce only about 20 percent the amount of shrimp.

Apparently the only manner in which the catch of shrimp along the west coast of Mexico can be increased is by an expansion of the fishery into new areas. This brings up the question, what shrimp-producing areas remain that are not now fished? From our knowledge of the environmental factors that control the distribution of shrimp, it appears that there are two such areas remaining--that between Mazatlán and Cape Corrientes, and that between Salina Cruz and the Guatemalan border. The productivity of these areas probably will not compare with that of the Gulf of California.

Passing from the Pacific to the Gulf of Mexico, we find a concentration of shrimp along the coast of Tabasco and western Campeche. This fishery is of quite recent origin but from the reports of the fishermen as to the trend of their catches, it is possible and even probable that this fishery has already reached its maximum productivity. There are no other areas along the Mexican coast in the Gulf of Mexico or in the Caribbean that appear even to approach the potentiality for shrimp production that the Campeche area has.

Probably the next largest fishery is that for shark. It is almost exclusively a west coast fishery. Shark are taken primarily for their livers, which are rich in vitamin A, and the west coast sharks, as a rule, have livers of higher vitamin potency than do the sharks in the waters of the Gulf of Mexico and the Caribbean Sea. The future of the shark industry does not look encouraging. The sharks have already demonstrated symptoms which lead us to believe that they can be readily depleted. Also, synthetic vitamin A has been produced in laboratories, and it is probably only a question of time before it will be available commercially.



CALIFORNIA SARDINE

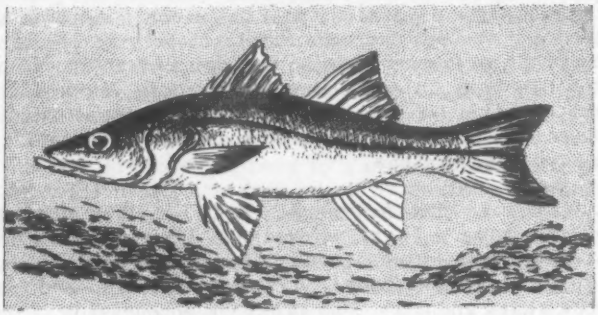
The California sardine, another important fishery, is, in Mexico, limited to the waters along the west coast of Baja California. The future of this fishery is, at the moment, a matter of speculation. The catch of this species in the United States, which normally exceeds that of Mexico by at least a hundredfold, has declined in the past several years at an alarming rate. There are two schools of thought regarding this decline. One is that the sardines have been depleted and the other is that for some unknown reason, they are now undertaking abnormal migrations. Irrespective of either of these hypotheses, it does appear that the California sardine could be much more important to Mexico than it now is. It is difficult to understand why this species has not assumed greater importance in Mexico than it has. The probable explanations are many, but none seems to be directly related to the abundance of fish.

Off Mexico, the Pacific mackerel inhabits almost the same waters as does the California sardine. Like the sardine, it seems to be more abundant than indicated

by present production. Also like the sardine, it is basically a "cheap fish." The enigma of the California sardine also appears to be the enigma of the Pacific mackerel. These problems appear to be basic, and apparently they must be solved before Mexico can increase her production of these fishes.

Now let us turn to the totoaba. This fish is limited to the waters of the Gulf of California. It also appears to be definitely limited in annual production. If the reports of the fishermen can be believed, this species may even be undergoing depletion. In any event, the totoaba cannot be relied upon as a fish supply capable of being greatly expanded.

The robalos, another relatively important group of fishes, occur on both coasts of Mexico. The robalos apparently are heavily fished only in parts of the Gulf of Mexico. Those of the west coast are relatively untouched. This probably results from the fact that robalos are not in demand as an export item, their only importance being that for local consumption, wherein again we encounter the "cheap fish" problem. How greatly the robalo fisheries can be expanded remains to be determined, but it is undoubted that they can be increased when the demand becomes greater.



ROBALO

The snappers (guachinangos and pargos), like the robalos, are found on both coasts. Here again, like the robalos, they are more heavily fished in the Gulf of Mexico than in the Pacific. Unlike the robalos, however, the snappers do have a limited export demand. Considerable doubt exists as to whether the production of snappers in the Gulf of Mexico can be increased appreciably. For some years past, the catch from the Campeche Banks has shown no increase and the fishermen have been complaining of the scarcity of fish on these banks. The snappers of the Pacific are still largely an unknown quantity.

The abalone, several species of which occur along the west coast of Baja California, is restricted to a narrow littoral belt, most of which is now being fished. It appears to be readily susceptible to depletion and the possibility of greatly increasing the catch of abalone seems remote.

The lobster (sea crawfish or spiny lobster), of which there are several species, is found on both coasts of Mexico. It is now fished commercially along only the Pacific coast of Baja California. Nowhere does it seem to occur in concentrations comparable to the shrimp and the sardine. Areas not now fished, but which, in the future, may come into production, are along the Gulf of California side of Baja California and around the Yucatán peninsula. The lobster fishery of Mexico will never be a great fishery for the simple reason that there are not enough lobsters.

The mullets are also found on both coasts of Mexico. In various places they appear to be quite abundant, and nowhere, except possibly in the lagoons of Chiapas, are they exploited near capacity. The mullets are definitely "cheap fish" and here again we encounter the phenomenon of almost non-utilization of an abundant "cheap fish."

The Spanish mackerels, like the mullets, are abundant on both coasts, are "cheap fish" and are not now utilized in porportion to their abundance.

We could continue on in like fashion with the other fishes of Mexico but there is no particular reason for doing so as none of the other species is now of particular importance nor does it appear that they are likely to become important in the immediate future.

When we consider in review the currently important fisheries of Mexico, we find that with the exception of the shrimp, not one exceeds a production of 9,000,000 annually. This amount is indeed small when compared to the yields of the major fisheries of the world. We also find that many of these, such as the abalone, shark, totoaba, and shrimp either have reached or exceeded their maximum production or are rapidly approaching this level. We further find that many of the more important fisheries such as the tunas, shrimp, abalone, totoaba, shark, and lobster, are taken almost exclusively for export. As a matter of fact, in 1941, according to the published statistics of the Dirección General de Pesca e Industrias Conexas, about two-thirds of the edible fishery products taken along the Mexican Coasts in that year were taken either by foreign boats or for export. Since that date, with the increase in tuna and shrimp catches, the fishery products caught for export or foreign markets as compared with those caught for local consumption, will probably show a still greater disparity.

In addition to those points already mentioned, we find that all of these exported fishery products fall within the luxury or semi-luxury classification. The difficulty with this situation is that Mexico does not appear to have many more luxury fishes of any importance, nor do those now being fished appear to be capable of sustaining greatly increased yields.

Of more fundamental importance to Mexico than any of the other points touched upon, is the evident fact that the really abundant "cheap fish" are not being utilized in any degree comparable to their abundance. Furthermore, such anomalies occur in Mexico wherein fish that should be cheap actually command luxury prices. Why is it that the only really important fisheries of Mexico, either for export or for local consumption, are luxury items? Why have the sardine and mackerel fisheries of Baja California not kept comparable pace with these same fisheries but a few miles to the north? These and many more similar problems are what I call here the "cheap fish" problem of Mexico. This to me, is the basic problem of the Mexican fisheries.

No country of which I am aware, has become a truly important fishing country without first solving its local "cheap fish" problem. It is on "cheap fish" that most of the major fisheries of the world are based, and I believe that Mexico will not assume her rightful place amongst the fish-producing countries of the world until she has solved her "cheap fish" problem.

Now comes the important question. How is Mexico to solve her "cheap fish" problem? Frankly, I do not know. There are such a multiplicity of factors that appear to be the causes of the condition, that there evidently is no one certain and easy solution. On the contrary, there appear to be a multiplicity of solutions required. It may be the answers will be found amongst the following: increased competition throughout the fishing industry, starting with the fisherman and ending with the retailer; volume production and sale with small profit on individual items; improved packs; increased local consumption; higher standard of living for the masses, technological research to develop acceptable packs of those fishes that

are abundant but not in demand; advertising campaigns; improved and increased transportation facilities; better handling methods; increased ice facilities; better fishing methods, etc.

As you can see, these solutions are not easily attainable, nor can they be arrived at overnight. It will probably be some time before all of them are accomplished. Likewise, it probably will be some time before Mexico solves her "cheap fish" problem. However, the sooner this problem is solved, the better it will be for Mexico and also for the world as a whole.

FISHERY MOTION PICTURES

The Fish and Wildlife Service has available fishery motion pictures and also a number of educational films dealing with subjects that are very closely related to commercial fishery operations. Most of these films are 16mm sound motion pictures which may be borrowed free of charge upon request. Requests for booking the films should be made as far in advance as possible. Each request should indicate clearly the address to which the shipment is to be made. The shipments are usually made by express, the borrower paying transportation charges both ways. No charge is made for the use of the films. The user will be held responsible for any undue wear or tear of the film caused by faulty handling or dirty or faulty projectors. Sound films must not be run on silent projectors.

Films must be returned on the same reels on which they were received and must be returned to the same office from which they were borrowed.

Report of attendance cards are furnished with each film and should be filled in after the showing and returned as directed on the card.

Films borrowed are furnished with the understanding that there shall be no admission fees charged for programs on which the films are used, except when shown in theaters as part of a regular program. The taking of a "free will offering" for the purpose of defraying expenses of employing an operator is not construed as a violation of the regulations regarding admission fees.

--Fishery Leaflet 255

The Technological Research Program, 1948-49

Heads of the laboratories of the Technological Section of the Branch of Commercial Fisheries conferred with the Section Chief and Branch Chief in Washington early in July for the purpose of preparing a tentative program of projects for the laboratories which would meet the needs of the fishing industry as nearly as funds, facilities, and personnel would permit. Before coming to this conference, laboratory heads had interviewed representatives of all sections of the fishing industry in their areas to obtain their suggestions as to technological problems which needed study and solution. The results of these interviews were discussed at the conference and a tentative program was prepared.

At the same time that laboratory heads were asked to report to Washington letters were sent to trade organizations, labor unions, marine fisheries commissions, and others, enclosing copies of the previous year's program and a list of suggested projects for the current program. They were requested to obtain from their members suggestions as to the type of program they felt was most important. They were also asked to have a representative present their suggestions at a meeting on July 14 in Washington with the laboratory heads and the Section Chief and Branch Chief.

At this conference, the tentative technological program was discussed and to it added those suggestions of the industry representatives present. Obviously, it was impossible, with available funds and personnel, to undertake all of the investigations suggested. The final program was arranged by the technological staff according to the relative importance of the projects as gauged by the industry's interest and fitted into each laboratory according to facilities and personnel available.

The program for the present fiscal year ending June 30, 1949, is now under way and is as follows:

BOSTON, MASS., TECHNOLOGICAL LABORATORY

1. Freezing North Atlantic species of round fish at sea. After landing, the fish will be defrosted, filleted, refrozen, packaged, and stored.

   This study is for the purpose of determining whether or not the quality of fish handled in this manner is better than those handled in the usual way. The investigation will be handled primarily on board the Government-owned experimental vessel, Albatross III. Livers, viscera, and other waste material will be obtained for use in Project 5 under the Seattle Laboratory.

2. Investigation of pollution of clam beds in New England and development of purification methods.

Many New England clam beds have been closed to digging due to pollution. It is believed that improved methods can be devised to treat and cleanse the clams so that they can meet high quality market requirements. Various methods of washing and purging the clams will be investigated, on a pilot plant scale, to accomplish the desired results.

3. Isolation and identification of micro-organisms from fish and the fish holds of fishing vessels to determine their role in fish spoilage.

The information obtained from this investigation will be used to devise methods and chemical treatments for improving the quality of fish landed for filleting and sale fresh. It is also a cooperative project with Project 6 listed for the College Park Laboratory.

COLLEGE PARK, MD., TECHNOLOGICAL LABORATORY

1. Determination of food values of cooked fishery products.

Practically no data are available on this subject. It is needed to reply to requests for such data by members of the industry, workers in nutrition, and dieticians. It is also needed for home economists who are preparing balanced meals for the home and in school lunch programs.

2. Correlation of biological and spectrophotometric methods for the determination of vitamin A potencies.

These data are highly desirable since vitamin A oils are sold by fishermen on the spectrophotometric value and purchased by pharmaceutical firms on biological value. The purpose of the investigation is to coordinate these two values so that they will be more nearly equal. It is being conducted as a cooperative project with Project 3 listed for the Seattle Laboratory.

3. Determination of the rate of digestion of certain fishery products.

This information is continuously requested by workers in nutrition, members of industry, and dieticians. It will be closely coordinated with 1 above, and will furnish valuable information as to the food value of fish and other fishery products.

4. Preparation of canned sandwich spreads for the school lunch program.

Sandwich spreads acceptable to those arranging menus for use in school lunch rooms are urgently needed. A number of species of fish, which could be marketed more widely will be tested. Those first to be used are chum salmon, mackerel, lake herring, pollock, and rosefish.

5. Effect of fluctuating temperatures on quality of frozen fish in storage and transit.

This information is valuable in ascertaining the effect of changes in temperature of storage rooms on quality and on the storage life of both packaged and bulk fish. It is also desirable in evaluating the effect on quality of frozen fish which may be partially defrosted during transit in refrigerated trucks and refrigerated cars.

6. Identification of micro-organisms causing spoilage of fish and shellfish.

This is a cooperative project with that listed under Project 3 for the Boston Laboratory. The separation and identification of these micro-organisms is desirable and necessary in order to devise means to combat them, and thus produce higher quality fish for the market.

KETCHIKAN, ALASKA, FISHERY PRODUCTS LABORATORY

1. Clam processing methods.

This investigation is for the purpose of devising methods of processing which will eliminate the toxic property of the clams taken from certain areas in the territory. This will make it possible to find a market for the clams after processing which will furnish employment and augment the income of the fishermen.

2. Clam survey.

The objective of this investigation is to obtain accurate data on the seasonal and geographical distribution of the toxic clams. This information is needed in order to develop regulatory measures, if required.

3. Clam sampling and testing methods.

This study is for the purpose of improving the precision of securing samples and making tests on them.

Note: These three projects are a series and will furnish complete information as to the proper treatment of the Alaska clam industry.

SEATTLE, WASH., TECHNOLOGICAL LABORATORY

1. Freezing North Pacific species of round fish at sea. After landing, the fish will be defrosted, filleted, refrozen, packaged, and stored.

This is identical with Project 1 under the Boston Laboratory, except that both commercial and Government-operated vessels will be used in the preparation of samples of fish which are common to the North Pacific Coast. The objective is to determine whether or not the quality is better when fish are handled in this manner or by the conventional icing method. Some samples probably will be filleted, packaged, and frozen at sea for storage studies, for controls, and use in Project 2.

2. Frozen storage life of certain North Pacific species of fish.

This information is of value for such species as rockfish, Dungeness and king crab, pink salmon, Alaskan flounders, and pollock. The effect of anti-oxidants, packaging materials, and types of packages will be taken into consideration. It will ascertain the length of time fish can be held in storage before the quality depreciates materially.

3. Investigation of the correlation between the biological and the spectrophotometric methods for the determination of vitamin A in fish oils.

This is a cooperative study with Project 2 under the College Park Laboratory. The spectrophotometric method will be employed in this laboratory and the biological method will be handled at College Park where laboratory animals are available. Identical samples will be used in both determinations. An analysis of the data should yield a "correlation factor" by which future calculations can be made so that the same results from each method of assay will be obtained.

4. Studies on methods of extracting vitamin A from fishery products.

The effect of various drying and dispersing agents on the extraction of oil from low-fat livers will be considered. The study is for the purpose of obtaining basic information as to the mechanism of oil extraction from liver materials.

5. The determination of the vitamin A content of the livers of certain New England fish.

Samples of livers will be obtained under Project 1, Boston Laboratory, and forwarded to Seattle for the determination of vitamin A and the oil content of the livers. These data will be of value in developing new sources of vitamin A and a more economic use of fishery resources.

6. Determination of vitamin A in new species found in Alaskan waters in cooperation with the Alaskan exploratory fishery vessel program.

This will add to the volume of information dealing with sources of vitamin A and make possible a more complete use of the resource.

7. Determination of oil in fish meal in cooperation with the Association of Official Agricultural Chemists.

The determination of oil by the present methods in materials such as fish meal is highly inaccurate, particularly after storage, and leads to much confusion between buyer and seller. It is the purpose of this investigation to devise official methods to remedy this inadequacy. Since the A.O.A.C. is the official agency for prescribing methods of analysis, these data are valuable to those having responsibility for fixing the feeding value of fish meal.

8. Pilot plant manufacture of fish hatchery food.

The purpose of this study is to develop methods of manufacture in which a minimum loss of nutritive components is obtained. Materials will be obtained from cannery and fillet waste. This is the first of a series of these studies, the other two follow.

9. Food for hatchery fish.

The increase in importance of the propagation of salmon by fish hatcheries brings up the problem of adequate food for the young fish at a reasonable cost. Preliminary studies indicate that waste material from salmon canneries and filleting operations can serve to replace meat to a considerable extent. The study is needed to prove which parts of salmon waste are most effectively metabolized and how they may be processed

without loss of nutritional elements. Federal and State hatcheries are collaborating in the study.

10. Chemical composition of fish hatchery foods.

Further information is needed on the chemical composition of hatchery foods so that more nutritious balanced diets can be prepared for the young fish. This series of studies (Projects 8, 9, and 10) will provide an outlet for waste material and furnish hatcheries with fish food, a product which is now difficult to obtain.

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Projects were assigned to laboratories on the basis of the facilities and personnel available. In some instances, projects are broken down in greater detail than in others, particularly because of the varied skills involved.

The whole program has been set up on a project basis and outlines prepared which incorporate such information as the project leader, collaborators, need for information, objective, method of procedure, estimated date of completion, estimated cost, and the manner in which results will be reported to industry. Provision is also made for periodic reports which will permit a check on progress being made and dissemination of such preliminary results as may be useful.

JUNE 1948

Boston, Mass.

The survey of clam beds in the Brunswick, Maine, area was completed. Results of the survey, as well as the data on the enterococci test, are being tabulated and evaluated. Equipment is being procured to photograph those organisms that interfere in the enterococci test.

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Gram positive rods have been observed, either as a pure culture or mixed with enterococci, in the presumptive broth used in the enterococci test. Whenever this organism, believed to belong to the genus Lactobacillus, appears as a pure culture, the color of the media changes partially, i.e., to a light green color.

Beaufort, N. C.

A series of tests were made of a new type of commercially developed shrimp trawl net using a 50-foot trawl with a trouser or double tail bag. One of the tail bags was constructed of the standard type of shrimp net of 2-inch stretched mesh, and the other of experimental netting with 2½-inch stretched mesh with the additional cotton threads for entanglement of the shrimp. The results of the first tests were inconclusive and further tests are to be made.

* * *

Studies on the utilization and development of new materials for fish models have continued resulting in additional plastic models of the cabio (Rachycentron canadus), the great barracuda (Sphyraena barracuda), the red porgy (Pagrus pagrus), and the spot-tailed pin-fish (Diplodus holbrookii). The largest fish model created thus far is a 31-inch long tarpon (Tarpon atlanticus).

College Park, Md.

Results of tests with frozen sea trout fillets indicated that maximum storage is between six and eight months under conditions of the test. There was no appreciable difference in palatability scores between fillets cut from fresh fish, from fresh fish held on ice for four days, from fish frozen for four days and partially thawed, and from four-day frozen fish completely thawed.

* * *

Sandwich spreads for use in the School Lunch Program were prepared from menhaden, garfish, and lake herring.

* * *

A sandwich spread prepared from Atlantic mackerel was given a test in two Maryland elementary schools. Acceptance was good.

Ketchikan, Alaska

The preparation of charts of clam beaches, showing the exact location where clam samples for toxicity tests were secured, is nearing completion.

Seattle, Wash.

Calculations were completed on the Alaska fur seal livers. No significant seasonal trends could be detected, but there was a slight tendency for the potency of the liver oil to increase with the age of the seal. A significant difference was found in the liver oil of the males and females, with the females yielding an oil of lower potency. A significant difference was also found between the normal-colored livers and those which were unusually pale. In a small sample of the latter, the vitamin A potency of the liver was 184,000 spectrophotometric units per gram. If an appreciable number of seals have light-colored livers, commercial utilization of these pale livers is indicated.

* * *

Seven lots of frozen crab meat were examined after 38 weeks of storage at 0° F. All packaged samples were edible and there was little difference in color and flavor scores of crab meat packaged in cellophane, tin, and tin with 1 percent brine. In general, the packaged crab meat was of marketable quality. Flavor varied from slightly flat to slightly off-flavored in separate portions from each sample pack; however, the more exposed portions in the dry packs did show a greater tendency for development of off-flavors. The texture of the meat was firm to tough in all packs; the brine packs had improved texture on the basis of tenderometer readings.

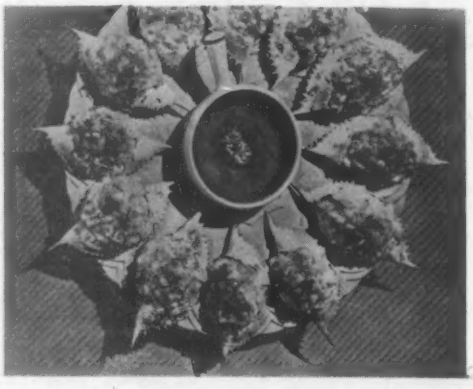
* * *

Crab meat shucked from frozen raw king crab legs was soft and fibrous in texture, off-flavored, and very difficult to separate from the shell. The meat from whole king crab legs which were frozen after cooking was highly variable in flavor and very tough in texture. Preservation of the crab meat by freezing in the shell appears to be impractical for any extended storage as the meat is not only inferior in flavor and texture but also is most uneconomical to separate from the shell.

* * *

Samples of fresh-water catfish and gaspergou livers from Louisiana were analyzed and found to be low in vitamin A but they contained a very large proportion of vitamin A_2.

DEVILED CRABS



1 pound crab meat
2 tablespoons onions, minced
3 tablespoons butter or other fat
2 tablespoons flour
¾ cup milk
½ teaspoon salt
1/8 teaspoon pepper
½ teaspoon mustard, dry
1 tablespoon lemon juice
1 teaspoon Worcestershire sauce
½ teaspoon sage
dash cayenne
1 egg, beaten
1 tablespoon parsley, minced
¼ cup bread crumbs
1 tablespoon butter

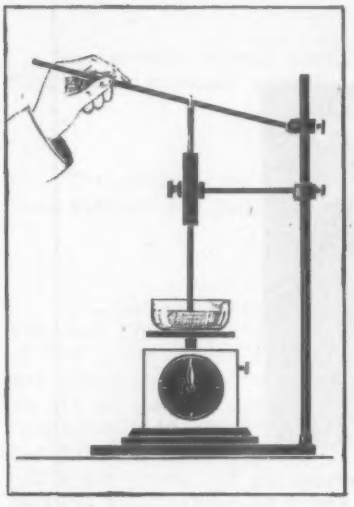
Pick over crab meat to remove any particles of shell, cook onion in fat until tender, blend in flour, add milk gradually, and cook until thick. Stirring constantly, add seasonings and beaten egg. Blend in crab meat and parsley. Fill crab shells or greased ramekins and sprinkle with buttered bread crumbs. Bake in a moderate oven at 350° F. for 15 minutes or until brown. Serves 6.

TRENDS AND DEVELOPMENTS

Abstract

STRENGTH MEASUREMENTS OF AGAR GELS: Fishery Leaflet 306, "Strength Measurements of Agar Gels," by L. S. Stoloff, formerly of the Branch of Commercial Fisheries, summarizes data on factors affecting strength measurements of agar gels and offers a recommended procedure for determining the strength of gels.

The study reported in this leaflet was conducted because of the paucity of research work on factors affecting stress-strain measurements on gels. Assuming that all gels have an elastic property, it becomes evident that a true consideration of gel strength involves breaking load (the force required to break the gel), breaking strain (the displacement of the gel at the elastic limit which is the point of rupture) and the elastic modulus (the displacement of the gel per unit of force). The work accomplished in breaking the gel may be computed from the breaking load and strain. It was found that factors having little or no effect on apparent gel strength are the rate at which the force is applied, the rate of which the gel is cooled, the temperature of the gel while aging, pH of the gel and the presence of sugar or peptone in the gel. Neither does the dimensions of the gel above certain limiting values affect the apparent strength.



Factors affecting apparent strength are the concentration of agar, temperature of gel, and the presence of calcium salts.

All the gels studied had about the same breaking strain for the same agar concentration. It was also found that elasticity is related to the breaking load by a constant inverse ratio so that a measurement of the breaking load alone becomes characteristic of the gel.

The measurement of the breaking load of agar gels of a fixed concentration is the most practical method for comparing the gelation of agars.

A Recommended Procedure: For the determination of breaking load, the most simple apparatus consists of a spring balance of one kilogram capacity equipped with an adjustable scale. Above this is attached a support and guide for the plunger. The plunger may be any convenient piece of cylindrical rod, faced off squarely at one end with the edge rounded slightly to prevent cutting of the gel. A plunger approximately 1.1 centimeter in diameter will cover the range of breaking loads ordinarily encountered. The plunger may be actuated by hand or through the medium of any mechanical device.

Gels are prepared by placing agar in a weighed flask together with the amount of distilled water needed to give the desired concentration. A convenient concentration for comparison of breaking strength is 1.5 percent. The agar is dissolved by heating in an autoclave for 20 minutes at 15 pounds steam pressure after which the weight is adjusted to the correct value by the action of distilled water and the solution is mixed thoroughly. The gels are aged a minimum of six hours at room temperature before being tested.

The prepared gel is placed on the pan of the balance which is tared to zero. The plunger is then forced against the surface of the gel until a break is evidenced by a sharp snap back of the balance dial. The maximum balance reading is noted as the breaking load.

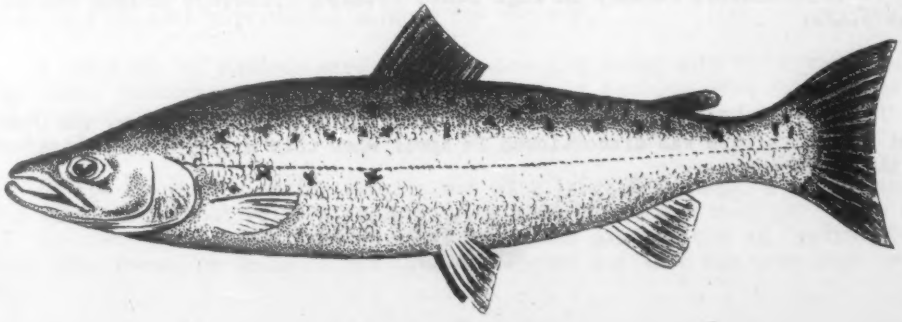
The details of experimental work are reported in Fishery Leaflet 306 published by this Service. A copy of this leaflet may be obtained from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

Agreement for Atlantic Salmon Restoration

The program to restore the Atlantic salmon to commercial importance in New England will be accelerated through a new agreement recently approved by the agencies engaged in the rehabilitation work, the Director of the Fish and Wildlife Service announced on July 15.

The cooperative agreement was signed by the Atlantic Sea-Run Salmon Commission and the State of Maine, the Maine Department of Inland Fisheries and Game, the Maine Department of Sea and Shore Fisheries, and the University of Maine in addition to the U. S. Fish and Wildlife Service. It became effective on June 25, 1948, superseding a more restricted agreement which has been in force since October 10, 1941.

The new agreement provides for a pooling of resources to accomplish the single, long-range objective of Atlantic salmon restoration on the Atlantic Coast and particularly in the Maine rivers where this species formerly was abundant. Under its terms, more efficient use of Federal and State funds, equipment, and personnel can be expected because overlapping functions and duplication of effort will be eliminated.



ATLANTIC SALMON (SALMO SALAR)

To put the new operating plan into effect, the Service has transferred Dr. George A. Rounsefell, Chief of its Atlantic Salmon Investigations, from Washington, D. C., to Orono, Maine, to direct the joint program of Atlantic salmon research, as provided in the agreement. Headquarters of the research staff will be located at the University of Maine.

Dr. Rounsefell will also represent the Service on a three-man research committee which will serve as a coordinating agency for all sea-run salmon restoration and management. The Department of Inland Fisheries and Game and the Department of Sea and Shore Fisheries will each appoint a biologist to serve on this committee.

The research committee will act in an advisory capacity on the joint research program and will develop and recommend to the Atlantic Sea-Run Salmon Commission a general policy on artificial propagation and stocking of salmon. It will also make plans and specific recommendations covering fishways, dams, stocking, fishing regulations, and pollution abatement.

The Service will continue to propagate sea-run salmon at its Craig Brook, Maine, fish hatchery for stocking in the rivers of Maine.

The Atlantic salmon is an example of a resource which, through negligence, has almost been lost. This salmon was once abundant in nearly every river tributary to the Atlantic north of the Hudson. By the late 1930's, the runs in New England had decreased almost to the point of extinction. Today, remnants of Atlantic salmon runs in the United States are found only in a few rivers in eastern Maine.

The principal causes of the decline in the number of salmon were the construction of impassable dams which blocked the adults from the spawning grounds, extensive pollution from industrial developments, and overfishing.

Federal Purchases of Fish

DEPARTMENT OF THE ARMY: Purchases of fresh and frozen fishery products by the Army Quartermaster Corps for the U. S. Army, Navy, Marine Corps, and Air Force for June 1948 for military feeding amounted to 1,410,309 pounds valued at $461,212. The total purchases, January through June, totaled 7,924,630 pounds valued at $2,875,420.

* * * * *

DEPARTMENT OF AGRICULTURE: The purchasing of fishery products by the Department of Agriculture was discontinued in April when this activity was transferred to the U. S. Army.

Flood Damages Fish Hatcheries and Salmon Stocks

Flood waters which ravaged the Columbia River valley during May and June caused at least $300,000 damage to Federal fish hatcheries.

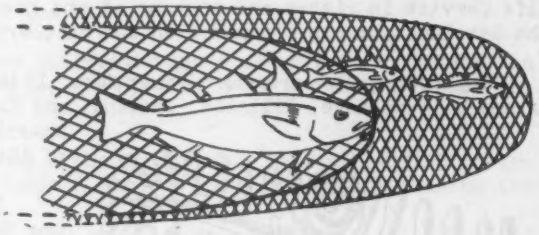
This estimate was made July 16 by the Chief of the Fish and Wildlife's Branch of Game-fish and Hatcheries.

Fish production in the area has probably been seriously affected. A considerable number of young salmon were trapped on the flooded land when the receding water left them stranded. Others were stranded when the flood waters damaged hundreds of irrigation ditch screens located in the fish-ways of dams along the river.

Definite effect on salmon returns will not be evident for three or four years, when the fish hatched this year will return to the area to spawn.

Haddock Tagging Continued by "Albatross III"

The Albatross III, on its fourth cruise, June 21 to 27, continued the tagging of haddock on Georges Bank. This cruise continued the experiments with larger mesh nets and the tagging of haddock captured by these nets started on Cruise 3. The work of Cruise 3 was interrupted because bad weather made it impossible to obtain live fish for tagging.



COD END

Cruise 4, the longest made so far by the newly-commissioned research vessel of the U. S. Fish and Wildlife Service, took the ship to eastern Georges Bank. Fourteen stations were occupied at various locations on the bank to obtain live haddock. A 1-1/2 Iceland net fitted with a 4-5/8-inch mesh cod end was used on all tows. The cod end was covered with a fine-mesh netting, so that all fish which escaped through the 4-5/8-inch mesh cod end were captured. Haddock from the fine-mesh cover and from the large-mesh cod end were tagged to test the survival of fish that have passed through the cod end.

A total of 332 haddock were tagged on the gill cover with 1/2-inch celluloid disc tags. Measurements of fish length and scale samples were taken from the other important species of fish captured. These data will be used to study the growth of these fish.

At the conclusion of the experiments with large-mesh nets, a comparison of nets with and without rollers and with fine-mesh liners was started. These nets will be used in later work for sampling the fish populations on Georges Bank. These experiments on Cruise 4 had to be postponed due to a bad tear made in one net.

Imports of Groundfish, Including Rosefish, Fillets

Imports of cod, haddock, hake, pollock, cusk, and rosefish fillets during the first six months of 1948 amounted to 25,319,450 pounds, 13,500,000 pounds more than the receipts during the first six months of 1947. However, the total imports for the first half of 1948 were only about 800,000 pounds greater than those received during this period in 1946.

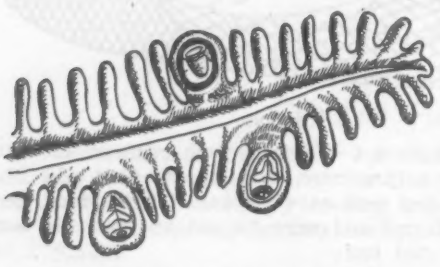
Imports of Groundfish, Including Rosefish Fillets

Country	Six months ending with June		
	1948	1947	1946
	Pounds	Pounds	Pounds
Canada	15,248,362	8,879,000	19,634,000
Newfoundland	7,583,000	1,992,000	2,125,000
Iceland	2,479,248	944,000	2,763,000
Denmark	8,800	-	-
Sweden	40	-	-
Norway	-	-	1,756
Total	25,319,450	11,815,000	24,523,756

Mussel-breeding Program

Fresh-water mussels are being bred artificially by the U. S. Fish and Wildlife Service in rivers and streams of the Mississippi River basin, the Chief of the Service's Branch of Game-fish and Hatcheries announced on July 14.

The propagation program began in June. It is operating in Oklahoma, Mississippi, Arkansas, Tennessee, Illinois, Indiana, and Missouri. Investigation for suitable spawning areas was started in the fall of 1947.



GLOCHIDIA ATTACHED TO THE GILLS OF A FISH (VERY STRONG ENLARGEMENT)

In addition to the breeding work, the Service is seeking abundant sources of adult mussels to provide the glochidia (miscroscopic-sized infant mussels) with which to infect host fish in their experiments.

Fresh-water mussels are an important source of shells for the button industry. The production of mussel shells for button manufacturing once supported a large industry in the Mississippi River valley.

During the past decade, however, sewage and erosion polluted many of the rivers in which mussels dwelt. The mussels decreased sufficiently to make necessary artificial propagation by Federal authorities. This work was begun in 1940, but was discontinued because of the lack of funds.

In resuming the work this year, the Fish and Wildlife Service is using improved methods of propagation. Smaller numbers of infant mussels and host fish are being used. The breeding process is as follows:

Fish are taken from river waters which are considered clean enough to provide a habitat suitable for the growth of fresh-water mussels. The fish are placed in small tanks containing a chemical solution making them antiseptically clean.

Glochidia (infant mussels) are then removed from the pouches of adult female mussels, and are put into the small tanks with the fish. The infant mussels attach themselves to the gills and fins of the fish and live as parasites.

After they have been infected with the infant mussels, the host fish are returned to their native waters. In a week or two, the infant mussels fall off the fish, and settle at the bottom of the river.

Depending on the water and food conditions, the mussel matures on the river bottom in three to five years.

Because of the lengthy period required for growth, the Fish and Wildlife Service will not be able to survey the success of their mussel-breeding work until at least 1951. At that time the Service will determine whether to abandon or expand its activities.

Qualified Personnel Shortage Handicaps Fishery Study

Lack of qualified personnel is restricting the study of Pacific fishery resources, according to the Director of the Fish and Wildlife Service.

The Service needs trained fishery biologists and oceanographers for work in a new research program which received an appropriation of $1,000,000 under the Farrington Act, Public Law 329.

The program is primarily concerned with developing a profitable fishing industry by American fishermen in the central Pacific oceanic area, including the former Japanese-mandated regions.

Construction of a laboratory on the University of Hawaii's campus and the outfitting of three vessels for experimental fishing and scientific research is planned. Eighteen fishery biologists and oceanographers, a similar number of specialists in commercial fishing and the processing of fishery products, and necessary vessel crews will be employed for the program.

Honolulu will serve as headquarters. From there, exploration and research will be conducted in the Line, Marshall, Marianna, Caroline, and Palau Islands.

Positions are available for fishery biologists and oceanographers in grades P-2 to P-5 with annual salaries from $3,727 to $6,235, plus a pay differential up to 25 percent for service in Hawaii. Additional personnel is also needed for continuing and expanding activities in the United States and Alaska.

Applicants for the fishery biologist positions require a bachelor's degree in biological science, with emphasis on the study of aquatic organisms, and a minimum of one year of fishery experience.

Applicants for the oceanographer positions require a bachelor's degree in one of the physical sciences, and a minimum of one year of experience in one of the oceanographic fields.

Qualified persons who are interested in employment in the Pacific or in the United States and Alaska should write to the Director, U. S. Fish and Wildlife Service. Department of the Interior, Washington 25, D. C.

Third Quarter Quota for Groundfish Fillets Filled

In accordance with the provisions of the tariff regulations enacted on January 1, 1948, concerning imports of cod, haddock, hake, pollock, cusk, and rosefish fillets, etc., the Bureau of Customs increased the duty from 1-7/8 cents per pound to 2-1/2 cents per pound, effective on July 27, 1948. Heavy imports in recent weeks made it apparent that the third quarter's quota of 6,23?,000 pounds at the reduced tariff of 1-7/8 cents per pound would be filled on or shortly after that date.

Since the quota is now on a quarterly basis, it won't be until after October 1, 1948, that these fillets can again enter at the reduced tariff of 1-7/8 cents per pound. Imports received after October 1 will again enter at the reduced tariff until the 12-months' quota of 24,930,188 pounds is exhausted, of which amount 6,231,188 pounds comprises the quota for the fourth quarter.

The total imports of these fillets through July 27, 1948, is estimated at 31,000,000 pounds, of which amount 18,699,000 pounds entered at the rate of 1-7/8 cents per pound and the balance at the rate of 2-1/2 cents per pound.

Wholesale and Retail Prices

Wholesale prices for all commodities and for all foods continued to rise at about the same rate during the period from May 15 to June 15, although the rate was not as great as earlier in the year, according to the Bureau of Labor Statistics, U. S. Department of Labor. The Retail Price Index again increased for all foods and was 1.5 percent higher than the preceding month, when the gain was 1.4 percent. This occurred in spite of the seasonal decrease in the retail price index for fresh and frozen fish which had the largest drop in any month this year. However, the fresh and frozen index was 11.5 percent higher than on June 15, 1947. The price of canned pink salmon also showed an increase and reflected the higher 1948 prices for salmon for canning.

Wholesale and Retail Prices

Item	Unit		Percentage change from--	
Wholesale: (1926 = 100)		June 12,1948	May 15,1948	June 14,1947
All commodities	Index No.	164.9	+0.9	+11.7
Foods	do	180.1	+0.7	+10.9
Fish:				
Canned salmon, Seattle:		June 1948	May 1948	June 1947
Pink, No. 1, tall	$ per doz. cans	5.27	+1.9	+71.7
Red, No. 1, tall	do	6.40	0	+16.7
Cod, cured, large shore, Gloucester, Mass.	$ per 100 lbs.	14.50	0	+ 7.4
Retail: (1935-39 = 100)		June 15,1948	May 15, 1948	June 15,1947
All foods	Index No.	214.1	+1.5	+12.4
Fish:				
Fresh, frozen, and canned	do	299.3	-1.9	+17.5
Fresh and frozen	do	251.0	-4.1	+11.5
Canned salmon: Pink	¢ per lb. can	53.2	+1.5	+31.7

Argentine Republic

ARGENTINA PELAGIC WHALING: Argentina has extensive plans for pelagic whaling, according to the Royal Norwegian Information Service. A representative of an Argentine company is visiting Norway to hire 400 whalers for the factory ship Juan Peron. The company has leased the South Georgia Islands for 20 years.

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EXPANSION OF FISHERIES PLANNED: Plans for the expansion of Argentina's relatively minor fishing industry will be formulated soon, Dr. Carlos Gonzalez, of the Argentine Ministry of Agriculture, stated in Washington on July 14.

The expansion will be the result of a year's study of United States fishery economics, just completed here by Dr. Gonzalez. On the request of the Argentine Government, he had been awarded a training grant by Albert M. Day, Director of the Fish and Wildlife Service, under the United States program for cooperation with the American republics. Dr. Gonzalez will return to his country on August 5.

His study emphasized the fishery problem from the Government's point of view, rather than private industry's. It included:

1. Fish inspection techniques,
2. Preparation and distribution of fishery statistics and market news,
3. Sanitation methods in commercial fisheries,
4. Government conservation of fishery resources.

The knowledge that he has acquired in the United States will be applied to Government operations in the Argentine fishery industry, Dr. Gonzalez explained. He hopes to see the Ministry of Agriculture's Division of Commercial Fisheries, of which he is a member, develop into an organization similar to the Fish and Wildlife Service.

Because Argentina produces so much meat so cheaply, it has never developed its vast fishery resources fully; but it plans to double its annual fish production of 130,000,000 pounds. The expanded fishery industry will then be able to supplement the Argentine diet, Dr. Gonzalez said. In line with this, his country is now also encouraging fishermen-immigrants all over the world to come to Argentina.

Canada

EMBARGO ON EXPORTS OF SALMON: An earlier order placing an embargo on raw salmon (Commercial Fisheries Review, May 1948, page 31) was supplemented on June 17, 1948, by an order placing an embargo on the exportation of frozen sockeye

(red), chum (fall), and pink salmon. The fish must be retained in Canada for processing in order not to deprive the British Columbia canning industry of considerable quantities of raw materials, resulting in curtailed operations and loss of direct employment in the canneries, according to the Chief Supervisor of Fisheries in Vancouver and as reported by the American Consulate General at Vancouver.

Another order on June 26, 1948, supplementing the two previous orders, placed an embargo on the exportation of frozen chum (fall) salmon only until September 1, 1948, but excepted frozen chum salmon from the 1947 catch.

Therefore, the three orders placed a complete embargo on exports from Canada of fresh sockeye, pink, and chum salmon, and on fresh coho (silver) salmon after September 1, 1948; a complete embargo on frozen sockeye and pink salmon, and on frozen chum salmon until September 1, 1948, except frozen chum salmon from the 1947 catch. Still permitted is the export from Canada of fresh and frozen spring (chinook or king) salmon; frozen coho salmon; and fresh coho salmon until September 1, 1948. There are no restrictions on exports of any species of canned, salted, smoked, and cured salmon, and on fresh and frozen spring salmon.

SALMON PACK IN BRITISH COLUMBIA: The salmon pack in British Columbia as of July 3, 1948, amounted to 36,122 cases, compared with a pack of 24,297 cases at this time last year and a pack of 17,575 cases for the corresponding period of 1944.

The pack by species as of July 3, 1948, is shown below with comparative figures for 1947 and 1944:

Species	1948: to July 3 Std. cases1/	1947: to July 5 Std. cases1/	1944: to July 1 Std. cases1/
Sockeye	12,597	16,431½	10,819
Springs	1,370	510	548
Steelhead	231	95	66
Bluebacks	8,726	2,919	5,504
Coho	12,460	3,829	470
Pinks	250	31	21
Chums	488	482	147
Totals	36,122	24,297½	17,575

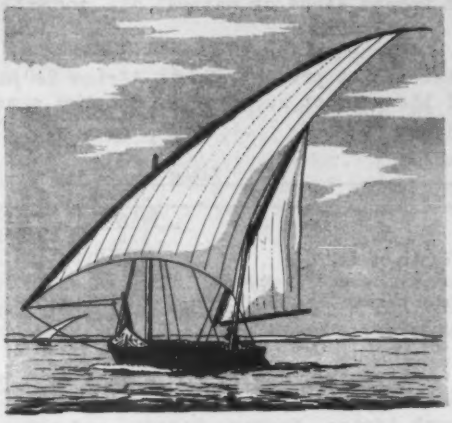
1/ 48 - 1 pound cans.

It appears that there will be no tie-up of salmon fishing vessels in British Columbia this season as all indications are that fishermen will accept the canners' offer of 18 cents a pound for sockeye, 14 cents for coho, 6¾ to 7½ cents for pink, and 6 to 6½ cents for chum, depending on area in the latter two cases. The prices offered the fishermen are substantially higher than those in effect last year.

It appears probable that the United Kingdom will not be in a position to purchase canned salmon from British Columbia in 1949 and, consequently, there is considerable uncertainty regarding the successful marketing of this season's pack.

Egypt and Middle East

MARKETS FOR PRESERVED FISH: Introduction: Although supplies of fresh fish are available to Egypt and Middle East countries from the Mediterranean, the Red Sea, the Persian Gulf, and the Caspian Sea, distribution is hampered by the lack of modern refrigeration facilities, and methods of preserving and canning the fish are utilized to only a limited extent. Consumers depend considerably on imported supplies of preserved fish, according to an article appearing in the July 3 issue of Canadian Foreign Trade.



CARGO BOAT ON THE NILE

In prewar years, Canada was an important participant in these markets, but, due to the current acute shortage of dollar exchange and the fact that preserved fish is regarded as a food requirement of lesser essentiality procurable for sterling, permits would not be granted for the importation of preserved fish into any of these countries with the exception of Iran and some of the states in the Arabian Peninsula. Moreover, in Iran, where dollar exchange is more readily available, the fish industry is a government monopoly, and fish imports are not encouraged. In the Arabian Peninsula, the population is small and consumption is accordingly low.

United Kingdom Supplies Smoked Fish: The only smoked fish known to enter into Middle Eastern markets in any quantity is herring, of which the United Kingdom is, at present, the main supplier. Before the war, Holland was the principal supplier of this item, and while Holland, Denmark, Norway, and Canada are now all offering the product, the United Kingdom dominates the market, chiefly because at least one British firm is willing to ship on consignment and is able to make deliveries in shipload quantities. The Alexandria agent of such a British firm maintains stocks as large as 80,000 boxes, held at shipper's risk. As far as is known, this particular trade in smoked herring is confined to Egypt.

Table 1 - Egypt--Imports of Preserved Fish

Product	1947		1946		1945	
	Weight	Value	Weight	Value	Weight	Value
	lbs.	$(U.S.)	lbs.	$(U.S.)	lbs.	$(U.S.)
Fish, fresh, salted, dried or smoked	8,686,982 1/	1,333,779	6,811,347 1/	1,194,016	734,309 1/	167,938
Fish, tinned, etc.	3,595,088	996,714	1,715,476	631,650	2,049,472	641,682
Total	12,282,070	2,330,493	8,526,823	1,825,666	2,783,781	809,620

1/ Gross weight--includes weight of packing.

Another smoked fish which is popular when available (chiefly during the winter) is smoked lacarda from Turkey.

Of salt fish, cod is the only one of importance. With Moslems, it is a popular item of food during Ramadan, the month of fasting, which is observed every year. The requirement is for very dry, hard fish (25 percent moisture content) that will keep in hot climates. Currently, imports are from Norway, which are able to meet local requirements as to dryness.

Low-priced Canned Fish Favored: In canned fish, the greatest volume of business is done in low-priced varieties that can be retailed at a figure low enough to cater for the masses of the population. Canned herring, pilchard, and some sardines are in this low-priced group. Main supplies of canned herring come from the United Kingdom and Norway. This fish is sold in flat oval tins of 14 ounces, in tomato sauce or natural oil, and retails at slightly less than 30 cents per tin.

Canned pilchards were imported in prewar years from Canada and the United States. At present, South Africa is participating in this trade, but the flavor of the product supplied is not the same as that of the American, and it has not become popular.

Table 2 - Palestine--Imports of Preserved Fish

Product	Jan.-Oct. 1947		1946		1945	
	Weight	Value	Weight	Value	Weight	Value
	lbs.	$(U.S.)	lbs.	$(U.S.)	lbs.	$(U.S.)
Fish in brine	2,832,140	406,450	7,440,704	1,061,562	6,843,420	1,119,272
Fish, dry, salted or smoked	3,329,735	338,528	5,704,618	722,269	849,765	121,432
Fish, tinned, in oil	4,439,327	1,228,038	3,684,881	1,241,264	2,075,799	883,328
Total	10,601,202	1,973,016	16,830,203	3,025,095	9,768,984	2,124,032

Portugal, Spain, and Norway Supply Sardines: Sardines may be divided into two classes: luxury and popular. Sources of supply are Portugal, Spain, France, North Africa, Norway, Canada, and the United States. Portugal, Spain, and Norway are the only countries active in the market at present. Portuguese sardines are packed in olive oil of the best quality, in 4½-ounce tins, which retail at about 40 cents. Norwegian sardines are packed in natural oils, or occasionally, in poor-grade olive oil, and in 3¾-ounce tins, retailing just under 20 cents. This price is not low enough to appeal to the bulk of the consuming population.

Canned mackerel is purchased as a substitute for canned salmon and is of little interest when salmon is available.

Table 3 - Sudan--Imports of Preserved Fish

Product	Jan.-Nov. 1947		1946		1945	
	Weight	Value	Weight	Value	Weight	Value
	lbs.	$(U.S.)	lbs.	$(U.S.)	lbs.	$(U.S.)
Salted fish	4,064,176	465,752	4,273,556	600,188	3,568,276	449,356

United States Canned Salmon Popular: Of prewar supplies of canned salmon, 80 percent came from Japan, the United States and Canada providing the remainder. During the war, when salmon was under allocation, the United States supplied the largest part of requirements, and well-known American brands became popular. The favorite pack is the 1-pound tall tin, and fish with a red color is greatly preferred. When Japanese salmon was available and at low prices, it was used by all classes of the population but, at current prices, salmon consumption is very much restricted.

Table 4 - Cyprus--Imports of Preserved Fish

Product	Jan.-Nov. 1947		1946		1945	
	Weight	Value	Weight	Value	Weight	Value
	lbs.	$(U.S.)	lbs.	$(U.S.)	lbs.	$(U.S.)
Dried, salted or pickled fish	-	-	1,175,664	338,617	282,688	102,882
Tinned fish	-	-	1/	100,544	1/	21,927
Fish	2,293,648	692,378	-	-	-	-
Total	2,293,648	692,378	1,175,664	439,161	282,688	124,809

1/ Quantity not available.

The extent of the potential market for preserved fish in the various countries of the Middle East is indicated in Tables 1, 2, 3, and 4 showing imports for the most recent periods for which statistics are available.

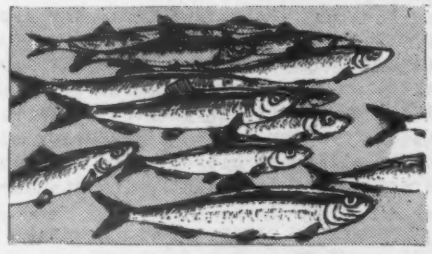
Great Britain

WHITE FISH AND HERRING INDUSTRIES BILL PASSED: On June 18, 1948, the "White Fish and Herring Industries Bill" was given its third and final reading in the House of Commons and passed, according to the American Embassy, London. A resume of the bill, and comments on the bill, appeared in the July issue of Commercial Fisheries Review, pages 29-31. Very few changes, except of very minor importance, were made in the third reading of the bill.

Reference was made in the debate on this bill to the herring oil experiments being carried on at Lerwick, and one suggestion, which was not incorporated in the bill, was that fish other than herring should be included in the oil and other experiments authorized.

Iceland

FISH SALES AGREEMENT WITH UNITED KINGDOM: The Icelandic Foreign Office announced on June 10 the conclusion of a fish-sales agreement with the United Kingdom, resulting from negotiations begun in February, according to the American Legation at Reykjavik.



The British will purchase:

1. 13,000 tons of herring oil, 4,500 from the winter production at $391 per ton (f.o.b.), and the remainder from the anticipated summer catch at $383;
2. 8,000 tons of frozen fillets at the Icelandic "Government guaranteed price," which is equivalent to $452 per ton for cod, and varies in proportion for other white fish;
3. 5,000 tons of herring meal from the winter production at $141 per ton (f.o.b.) with an option on 40 percent of the summer production at $129 per ton.

Prices are approximately the same as those paid by the United Kingdom in 1947, except for herring meal, which is about 10 percent higher. In the case of herring oil, prices are somewhat below Icelandic estimates of production costs, but in the case of fillets, they are above open market prices in Great Britain.

In addition, Iceland may sell up to 12,000 tons of herring oil at $403 per ton (f.o.b.), if the summer catch proves sufficient, and the intention to deliver is declared before the end of October.

FOREIGN TRADE POSITION: Iceland's foreign trade position is more favorable at present than at any time since the close of the war.

A good share of the imports represent purchases abroad of goods essential to the operation of the fishing industry and for materials for the construction of new fish factories, some of which have already been started. Among the more important items appearing on this year's import list through May is an expenditure of $3,690,000 for fishing vessels, including large trawlers, and additional purchases in this category are scheduled to be made within the next few months. Such imports, which are readily licensed by the Import Board, reflect the Government's policy of stressing the need for procurement of goods of a productive character.

Japan

HERRING PRODUCTION: Herring catches account for approximately 31 percent of the total fish production in Hokkaido Prefecture and 14 percent in Japan Proper, according to the Supreme Commander for the Allied Powers in Japan.

This year, abnormally high water temperatures along the northwestern coast of Hokkaido apparently have driven the seasonal herring run off its normal migratory path into offshore waters. In April 1948, the herring catch, most of which is produced by Hokkaido, totaled 130,935 metric tons, as compared with 183,655 metric tons in April 1947. Further decreases in the course of the season were anticipated.

SANITARY INSPECTION LAW: The Japanese Public Health and Welfare Section is supporting the training of a large group of sanitary inspectors to enforce the sanitary inspection law. This law permits establishment of standards for raw fish inspection as well as standards for sanitary conditions in fish ports, distributing points, and processing plants. A budget of 24,000,000 yen has been provided to conduct the program, which will employ at least 2,000 inspectors. Natural Resources Section will work closely with the Public Health and Welfare Section in training inspectors and in establishing standards for fish inspection and sanitation.

TRENDS IN FISHERIES PRODUCTION: The following information on current trends in Japanese fisheries production was submitted to the Food and Agricultural Organization for its 1948 annual report.

During the peak period of fish production before World War II, the Japanese empire annually produced about 11,600,000,000 pounds of aquatic products. Of this, 8,500,000,000 pounds were from fisheries based on Japan Proper. The balance of 3,100,000,000 pounds was produced in Japanese colonies. All of the Japanese colonial fisheries and a small part of the fisheries based on Japan Proper were lost as a result of World War II. Average production from the area now authorized for Japanese fishing during the peak years of 1930-34 was about 7,260,000,000 pounds.

Production during the latter part of the war was greatly reduced by loss of boats and manpower to the armed forces, disruption of transportation, and shortage of supplies. Following the Japanese surrender, production was rapidly restored, and in 1946, the catch in the authorized area approximated the prewar level. This was accomplished by restoration of transportation facilities, an extensive boat building program, return of fishermen from the armed forces and colonies, dis-

tribution of cotton and other fibers released from Japanese army and navy supplies, and the importation of fuel oil and a small amount of fishing materials by the Supreme Commander for the Allied Powers. As a result of these developments and high postsurrender prices for aquatic products, fishing activities became intensive, and production rapidly rose to more than 7,000,000,000 pounds.

FISHING CORMORANTS, JAPAN

By the latter part of 1947, the stockpiles of materials left by the Japanese armed forces were nearly exhausted. Although imports of fishing materials by the United States Army were increased considerably, they were not sufficient to meet requirements. As a result, production in the last six months of 1947 declined to a level below that for the same months of 1946. Total production in 1947 was about 6,800,000,000 pounds.

Production in 1948 will depend primarily upon the amount of cotton, hard fibers, and fuel oil which can be imported for the Japanese fisheries. If such supplies are adequate, production of approximately 7,250,000,000 pounds can be expected. Achievement of this goal will also depend, to a considerable extent, upon the success of the herring and sardine fisheries which are notoriously variable and which supply a large proportion of the Japanese catch. Greater production is not expected, as virtually all Japanese fisheries are now intensively exploited and the possibility of materially improving their yield through increased exploitation is slight. The declines in some, such as the East China Sea trawl fisheries, are expected to compensate for any small increases in other fisheries. Any considerable increase in Japanese production is dependent primarily upon successful development of a long-range program for increasing the productivity of coastal and inland resources through aquiculture and better management of these resources.

TUNA FACTORY SHIP PLANNED: A Japanese company has submitted for approval of the Japanese Bureau of Fisheries, a plan for outfitting a 990-ton factory ship to be used in an experimental project for freezing of whole tuna and fillets of tuna.

This project is being designed to maintain a high standard of fish for export through improved handling and processing at sea. The vessel is expected to operate with seven catcher boats within the southeast corner of the authorized fishing area.

Norway

NEW HERRING PRODUCT: "Silver herring," a new fish product developed after 6 years of research, was recently announced by Norwegian fish exporters, according to the Royal Norwegian Information Service.

The new product is actually a development of the salt herring of old--utilizing a patented preserving agent which, unlike salt brine, conserves herring, mack-

erel, or whale beef, without any loss of their nutritive value or their original appearance. Another advantage of the new "silver herring" method is that the contents of a barrel or container may be served immediately without any preliminary soaking. Several thousand barrels of the new product have already been exported to Czechoslovakia.

TRADE PACT WITH WESTERN ZONE: A new goods exchange agreement between Norway and the Western Zone of Germany was announced in Oslo on July 8. From the Norwegian view, the new accord represents a decided improvement over the earlier pact, as both sales to and purchases from the Western Zone will be cleared in the same exchange. Under the earlier agreement, Norway was placed in the disadvantageous position of having to accept payment in pounds sterling for wares shipped to the Western Zone, while having to pay for imports from the same area from her dwindling supply of dollars. The new agreement calls for Norwegian deliveries of herring, fish products, and whale oil, and purchases of machines, metals, etc.

Poland

FISHERIES TO BE EXPANDED: Reviewing Polish maritime achievements during 1947, the Minister of Navigation stated that deep-sea fishing will be facilitated by the acquisition of new vessels and the construction of a fishing base at Swinoujscie, according to the American Embassy at Warsaw. The number of cold storage plants is being increased to enable the working class to obtain cheap fish throughout the year.

Puerto Rico

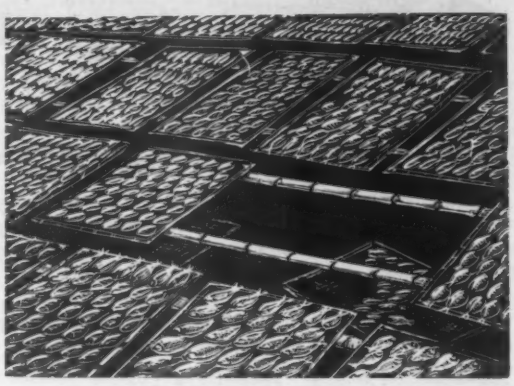
PROVIDES FAVORABLE SALTED COD MARKET: The foreign trade of Puerto Rico reached new high levels during 1947, characterized by a large import surplus, according to an article appearing in the July 10 issue of the Canadian review, Foreign Trade. There is a demand for salted cod in this Island, which is a part of the United States, and as such, goods shipped from the continental United States do not pass through the customs in Puerto Rico.

Puerto Rico is one of the largest consumers of salted cod in the Caribbean area and merits close attention by shippers of fishery products. In recent years, most salted cod has been supplied by Newfoundland at low prices, which has enabled the Puerto Rican Government to maintain the low ceiling price of 23 cents retail, as against a minimum of 30 cents in the Dominican Republic and from 38-45 cents in Cuba. While the present price range is not attractive, there are persistent demands for more of this product, provided it can be supplied within the wholesale ceiling of 19 cents. Contact should not be lost with this important fish market, whose consumption is some 35,000,000 pounds per year.

Republic of the Philippines

DEVELOPMENT OF FISHERIES: Ocean Fisheries: Plans for an intensive program of experimental and exploratory fishing in the Bicol provinces have been announced jointly by Dr. Deogracias V. Villadolid, Director of the Philippine Bureau of Fisheries, and H. W. Terhune, Administrator of the Philippine Fishery Program of the U. S. Fish and Wildlife Service, in response to requests by private and government entities in the area, according to a press release from the Philippine Bureau of Fisheries and the U. S. Fish and Wildlife Service.

According to the announcement, both agencies will concentrate on a cooperative program of assistance in the fishing activities of the provinces involved. Already, experts from the Philippine Bureau of Fisheries and the U. S. Fish and Wildlife Service, Philippine Fishery Program, have visited Albay, Camarines Sur, and Camarines Norte and laid the groundwork with officials and interested individuals for the program now partly being undertaken. Work has been started in the construction of fishponds and the procurement of gear for inshore fishing.



DRIED FISH (PHILIPPINE)

It is to meet the challenge of a stringent food situation in the Bicol provinces. Both the Philippine Bureau of Fisheries and the U. S. Fish and Wildlife Service, Philippine Fishery Program, are attempting a threefold fisheries development program, as follows:

1. Efforts are being made to develop certain unused areas for pond fish in both inland and salt water. This is being done by private interests with the advice of the two cooperating agencies.

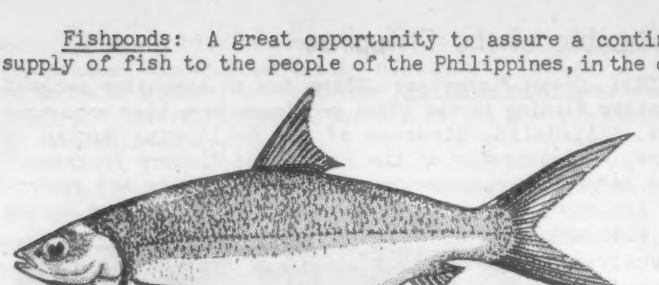
2. In-shore fishing is being inaugurated through the activities of labor groups and the International Chamber of Commerce of Legaspi under the supervision of representatives of the Philippine Bureau of Fisheries and the Philippine Fishery Program of the U. S. Fish and Wildlife Service.

3. The Theodore N. Gill, experimental fishing vessel of the Philippine Fishery Program will inaugurate exploratory work in the Legaspi and Tobaco region about June 15.

Elaborating on the fisheries development program, Dr. Villadolid declared:

> "It is believed that a worthwhile fishing industry of great potential value can be established in the waters of the Philippine sea once this is known and understood. The development of the fisheries resources of the Bicol provinces will mean much toward a balanced economy for the people who reside there. We hope to be able to point the way toward this development within the next few months."

Fishponds: A great opportunity to assure a continuing and always available supply of fish to the people of the Philippines, in the opinion of Hugh W. Terhune, is to be found in the bangos industry. The bangos is a small fresh-water food fish raised extensively in ponds. The raising of fish under controlled conditions, he said, minimizes the risks experienced in other fisheries of the world due to the vagaries of the weather, ocean conditions, and the unexplainable behavior of fish.



MILKFISH OR BANGOS (CHANOS CHANOS)

Mr. Terhune declared that the recent passage of the bill authorizing the sale of swamplands to promote and develop the fishpond industry of the Philippines constitutes one of the most encouraging steps that have been taken lately in the whole fishery industry of the Republic.

According to authorities of the Philippine Fishery Program of the U. S. Fish and Wildlife Service, there are approximately 1,082,000 acres of nipa and mangrove swampland awaiting development. This land, as it now stands, produces some firewood, some nipa shingles, tuba, vinegar and alcohol in very limited quantities. However, it is believed that the returns from the swamplands are only a fraction of what can be realized if the areas were converted into fishponds.

In contrast to the areas awaiting development, only 160,550 acres are under fish production at present. These areas are the basis of a $37,500,000 bangos industry. If one-fourth of the undeveloped land were converted into fishponds, 100,000,000 bangos could be produced annually. And at the present price of 50 cents per fish, the Republic would add $50,000,000 annually to its national income.

In addition, at least 10,000 men would find permanent employment on the ponds themselves, and marketing, fry-catching, transportation, and other aspects of the industry would, in all liklihood, swell the employment total, seasonal or otherwise, to around 100,000 people.

FISHERIES TRENDS: The U. S. Fish and Wildlife Service, working closely with the Philippine Bureau of Fisheries, has been conducting research and training local experts as a foundation for expanding the country's production of sea products. However, the analyses of characteristics of the coastal waters, and of fishing methods have barely begun to show their effects on actual production. Government projects for development of fishponds have not yet materialized, but private ponds show constant improvement. The Government has plotted the locations topographically suitable for additional fishponds, but study of their productive possibilities has not yet started. It is planned to conduct, on Panay Island, experiments on methods of increasing the fertility of ponds.

The activity and production of private fishing enterprises has been stimulated by the high prices for fish that have prevailed since liberation. The number of craft engaged in fishing operations increased from 504 at the end of 1946 to 612 at the end of 1947 and probably continued to increase in 1948 although registrations

have been slow. The increase in production is greater than the numbers of craft suggest, because provisions and capital for the repair and maintenance of fishing craft have become increasingly available. Further increase in efficiency has resulted from the adoption of otter trawls in place of the traditional beam trawling, which was wasteful of manpower. The Government has not enforced the prohibition against dynamiting, partly because it is too widespread to be policed, but also because of a conviction that enforcement would lessen the still inadequate supply.

The fish traps distributed throughout the Islands represent an important native investment that did not suffer serious damage during the war. The Japanese encouraged fish trapping, with the result that these private enterprises were reasonably maintained, and with postwar improvements, are considered to have a much greater capacity than before the war.

The supply of imported nets does not meet the demand. Inefficient nets of native fibers are substituted.

The continuing imports ($16,000,000 in 1947) and the sustained high prices for local fish prove the need of greatly increasing production. Imports, particularly of the popular canned herring, pilchards, and sardines from the United States will probably continue high for a considerable time. The export markets for Philippine sea products were weakened recently by action of the Chinese Government in prohibiting importation of beche de mar (sea cucumber) and shark's fins (used for gelatin in soups) because they are considered luxury products. There appears to be a reliable, although limited, market for typical Philippine fish products among the Philippine colony in Hawaii. Little, if anything, has been done in the postwar period to develop the potentially good export trade in sponges.

SCIENTIFIC FISHING DEMONSTRATOR APPOINTED: As a fishing demonstrator, Porfirio R. Manacop, Filipino fisheries expert, will go to the Bicol regions in the Philippines where he will illustrate, by practical examples, various methods of fishing to public and private entities interested in the fishing industry. On board a demonstration vessel of the U. S. Fish and Wildlife Service's Philippine Fishery Program, he will assist in the demonstration of, among other progressive American fishing techniques, the otter trawl.

Mr. Manacop went to Stanford University, U. S. A., as a fellow of the Philippine Government. His studies at Stanford earned him the degree of Master of Arts in biology.

Union of South Africa

DEVELOPMENT OF FISHERIES: The development of canning and processing plants along South Africa's West Coast has raised capital investment in the Union's fishing industry to more than $40,000,000, representing a threefold increase in three years, according to a South African Government report. There are now 5,000 fishermen engaged in the Union's fishing industry, with another 4,000 persons employed in the various processing and canning plants. Altogether, between 40,000 and 50,000 men, women, and children are dependent on the industry for their livelihood. At the beginning of this year, there were 2,219 fishing craft in use, valued

at $8,000,000. Included among these are 30 steam and 7 motor trawlers. The Union's fishing waters are now 150,000 square miles in extent, and more than four-fifths of the industry is based on the West Coast between Cape Town and Walvis Bay. Much of the trawling grounds along this coast is still unexploited. Cape Town is by far the most important of the Union's fishing centers. Of the 60,000,000 pounds of trawled fish caught annually, about 50,000,000 pounds is landed at this port.

FISHERY MARKET NEWS SERVICE
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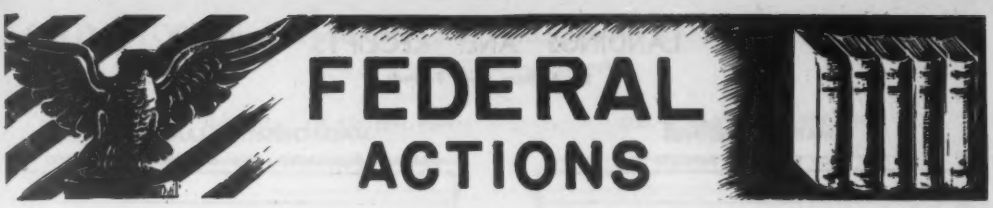


Department of the Interior

NEW ALASKA SET-UP APPROVED: To integrate fully and make more effective the Department of the Interior programs for the development of Alaska and its resources, Secretary J. A. Krug has approved an order establishing the Alaska Field Staff and the Alaska Field Committee to work under the general supervision of Assistant Secretary W. E. Warne in charge of Alaskan affairs.

At the same time, the appointment of Kenneth J. Kadow of Rockville Centre, New York, was announced to be Director of the Alaska Field Staff, ex-officio Commissioner and Chairman of the Alaska Field Committee with Headquarters in Juneau.

The new Director will supervise the field staff consisting of a small unit designed to coordinate Interior's varied Alaska programs and will act as the Department's representative in dealing with other Federal agencies, the Territorial Government, and public and private groups on matters of common interest; he will continually study the Department's operations in Alaska and provide a channel for the exchange of views and information; initiate and secure agreements necessary to the efficient and economical execution of Department programs in Alaska, and report, through the Director of Territories and Island Possessions, to the Secretary on matters requiring Department action.

The Director will serve as Chairman of the Alaska Field Committee, composed of a representative from each of the Department's Bureaus and organizations participating in Alaska programs. In conjunction with the Committee, before June 1, 1949, he will submit to the Secretary, a comprehensive 6-year program for Alaskan development.

The Field Committee is to advise and assist the Director, and consider and make recommendations on all matters relating to the Department's programs for Alaska. The Committee will provide a basis for the correlation of Alaskan activities of the various Bureaus of the Department.

FREEZING FISH AT SEA

There is no reason to assume that the New England type trawler will not be redesigned to become adapted to freezing fish at sea. Many engineering problems are involved, but they are not impossible of solution.

As the demand for higher quality frozen fish increases, there is every reason to believe that the industry will take steps to convert its vessels into the freezer type so that this demand can be met.

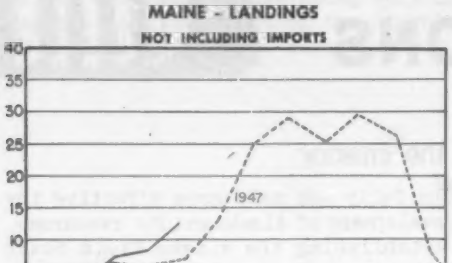
--Fishery Leaflet 278

LANDINGS AND RECEIPTS

In Millions of Pounds

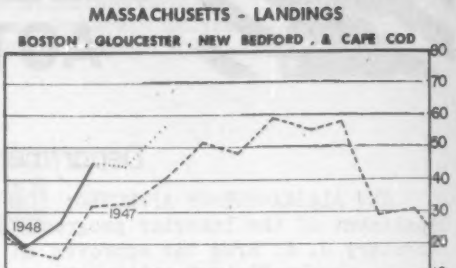
MAINE - LANDINGS

NOT INCLUDING IMPORTS



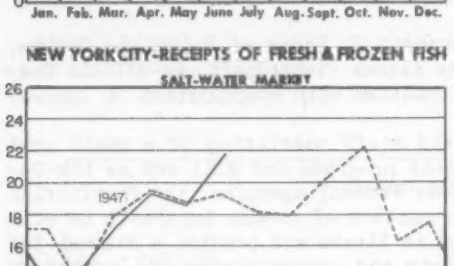
MASSACHUSETTS - LANDINGS

BOSTON, GLOUCESTER, NEW BEDFORD, & CAPE COD



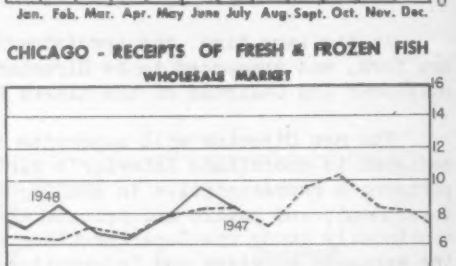
NEW YORK CITY-RECEIPTS OF FRESH & FROZEN FISH

SALT-WATER MARKET



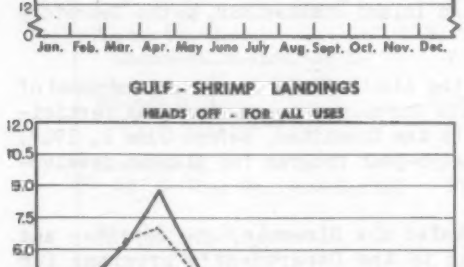
CHICAGO - RECEIPTS OF FRESH & FROZEN FISH

WHOLESALE MARKET



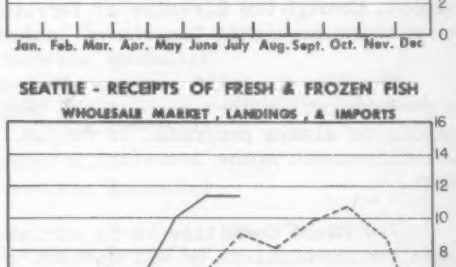
GULF - SHRIMP LANDINGS

HEADS OFF - FOR ALL USES



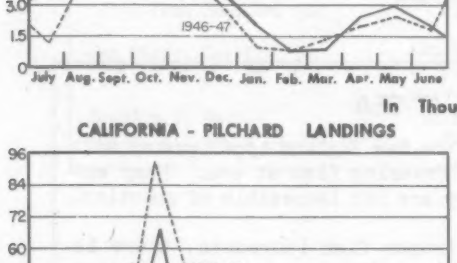
SEATTLE - RECEIPTS OF FRESH & FROZEN FISH

WHOLESALE MARKET, LANDINGS, & IMPORTS

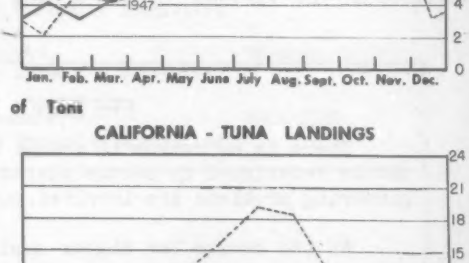


In Thousands of Tons

CALIFORNIA - PILCHARD LANDINGS



CALIFORNIA - TUNA LANDINGS

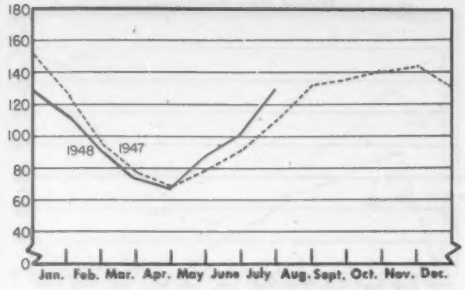


..... ESTIMATED

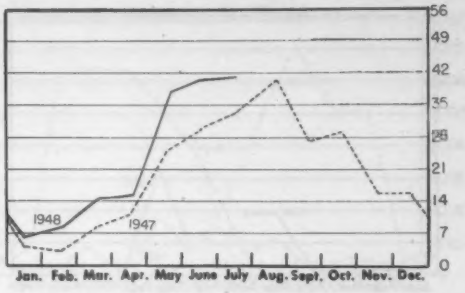
COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

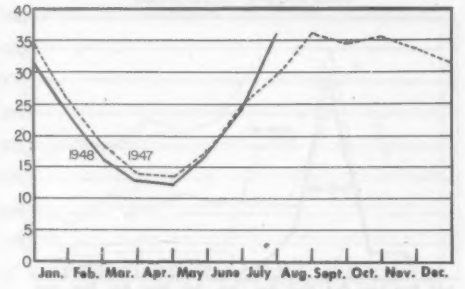
U.S. & ALASKA - HOLDINGS OF FROZEN FISH



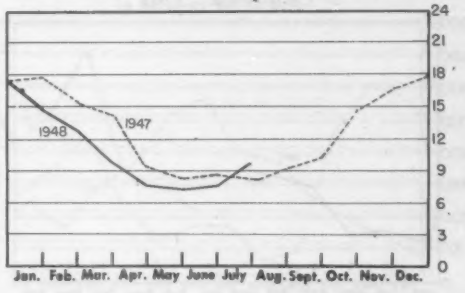
U.S. & ALASKA - FREEZINGS



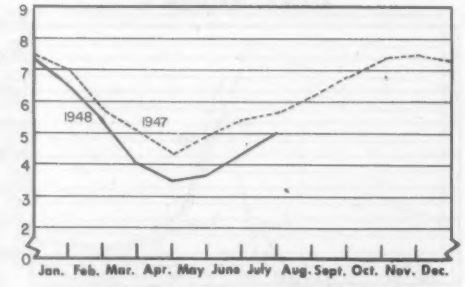
NEW ENGLAND - HOLDINGS OF FROZEN FISH



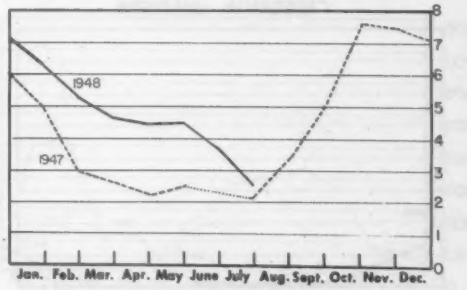
NEW YORK CITY - HOLDINGS OF FROZEN FISH



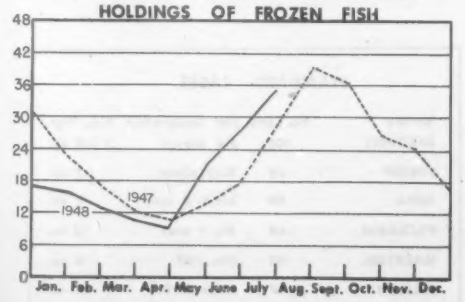
CHICAGO - HOLDINGS OF FROZEN FISH



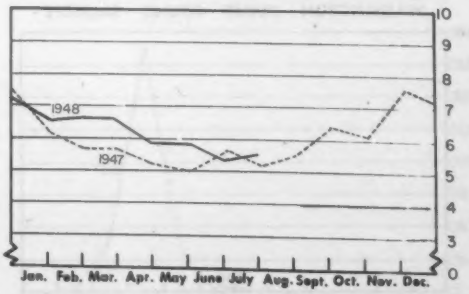
GULF - HOLDINGS OF FROZEN FISH



WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH



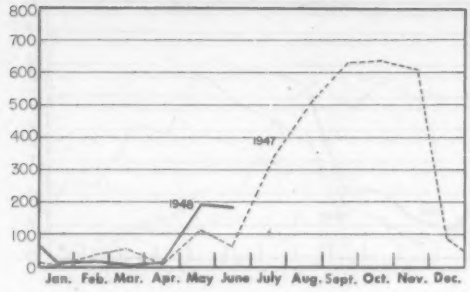
CALIFORNIA - HOLDINGS OF FROZEN FISH



CANNED FISHERY PRODUCTS

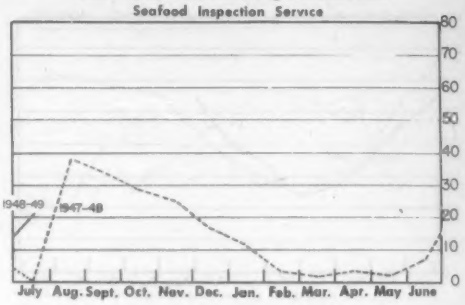
In Thousands of Standard Cases

MAINE - SARDINES, ESTIMATED PACK

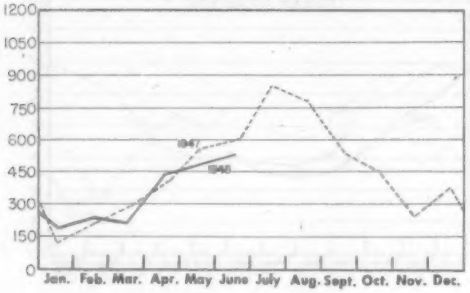


UNITED STATES - SHRIMP

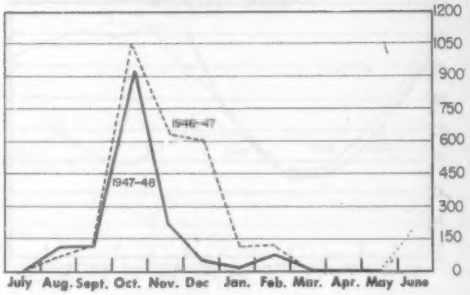
Plants under Food and Drug Administration Seafood Inspection Service



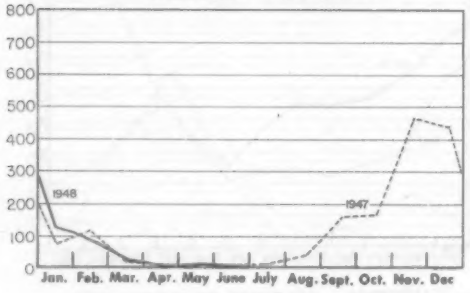
CALIFORNIA - TUNA



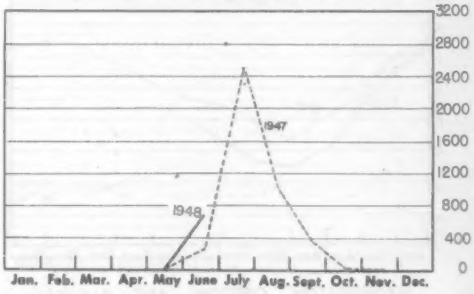
CALIFORNIA - PILCHARDS



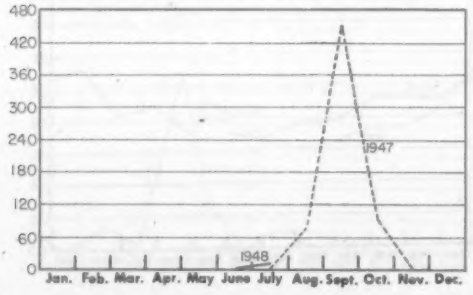
CALIFORNIA - MACKEREL



ALASKA - SALMON



WASHINGTON - PUGET SOUND SALMON



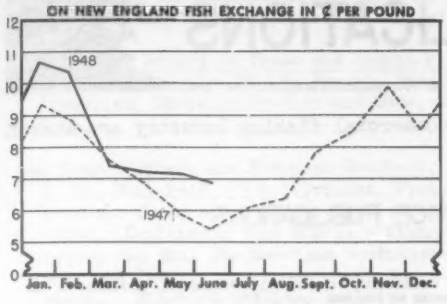
STANDARD CASES

Variety	No. Cans	Can Designation	Net. Wgt.
SARDINES	100	1/4 drawn	3 1/4 oz.
SHRIMP	48	No.1 picnic	7 oz.
TUNA	48	No. 1/2 tuna	7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
MACKEREL	48	No. 300	15 oz.
SALMON	48	1-pound tall	16 oz.

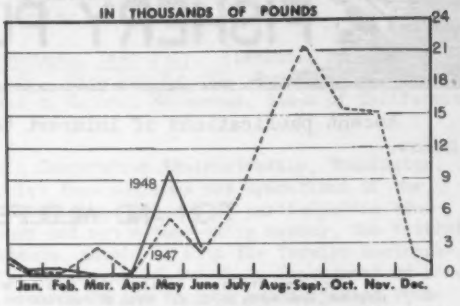
····· ESTIMATED

PRICES, IMPORTS and BY-PRODUCTS

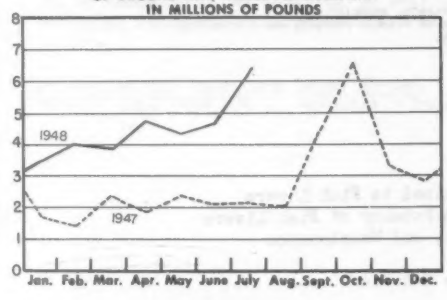
BOSTON - WEIGHTED AVERAGE PRICE
ON NEW ENGLAND FISH EXCHANGE IN ¢ PER POUND



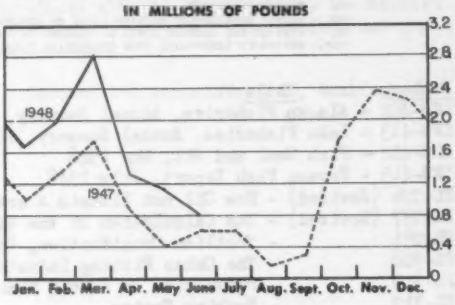
MAINE - IMPORTS OF SEA HERRING
IN THOUSANDS OF POUNDS



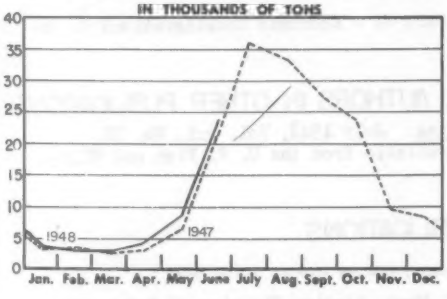
U.S. - IMPORTS OF FRESH & FROZEN FILLETS
OF GROUND FISH, INCLUDING ROSEFISH:-
IN MILLIONS OF POUNDS



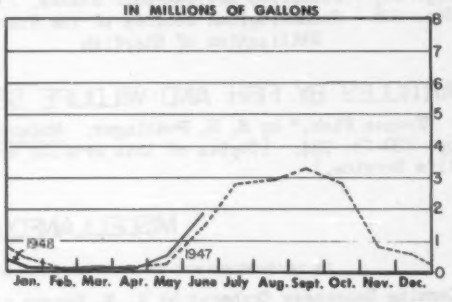
U.S. - IMPORTS OF SHRIMP FROM MEXICO
IN MILLIONS OF POUNDS

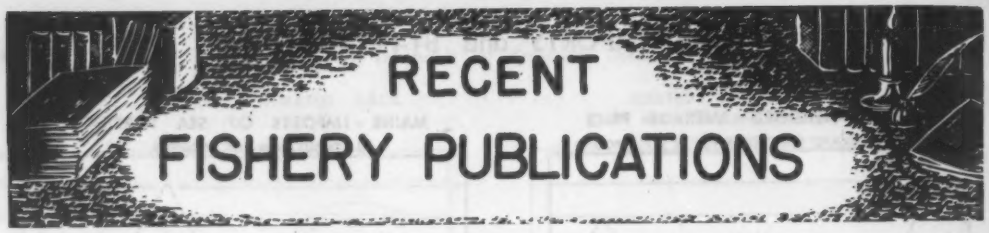


U.S. & ALASKA - PRODUCTION OF FISH MEAL
IN THOUSANDS OF TONS



U.S. & ALASKA - PRODUCTION OF FISH OIL
IN MILLIONS OF GALLONS





Recent publications of interest to the commercial fishing industry are listed below.

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
MDL - MARKET DEVELOPMENT SECTION LISTS OF DEALERS, LOCKER PLANTS, ASSOCIATIONS, ETC.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-401	- Alaska Fisheries, Annual Summary, 1946
CFS-413	- Lake Fisheries, Annual Summary, 1946
CFS-414	- Fish Meal and Oil, May 1948
CFS-415	- Frozen Fish Report, July 1948
FL-226 (Revised)	- How Oil and Vitamin A are Determined in Fish Livers
FL-237 (Revised)	- The Calculation of the Vitamin A Potency of Fish Livers
FL-291	- Trotline Construction, Operation, and Maintenance
FL-308	- The Cuban Fishing Industry
FL-310	- Production of Edible Fish in the Red Sea
FL-312	- Smoking Shrimp

Sep. 207 - Fisheries Review--Gulf States, 1947
Sep. 208 - Technological Studies of the Starfish - Part VI - Economic Considerations in the Utilization of Starfish

ARTICLES BY FISH AND WILDLIFE SERVICE AUTHORS IN OTHER PUBLICATIONS

"Frozen Fish," by S. R. Pottinger. Modern Packaging. July 1948, Vol. xxi, No. 11, pp. 120-23, 244. (Copies of this article are not available from the U. S. Fish and Wildlife Service.)

MISCELLANEOUS PUBLICATIONS

THE FOLLOWING PUBLICATIONS MAY BE OBTAINED, IN MOST INSTANCES, FROM THE AGENCIES ISSUING THEM.

Canning Dungeness Crabmeat by E. W. Harvey and F. C. Mann, Station Circular of Information No. 425. Agricultural Experiment Station, Oregon State College, Corvallis, Oregon, March 1948, 6 p., mimeographed. Free. This bulletin issued by the Seafoods Laboratory, Food Technology Department, Astoria, Oregon, attempts to standardize the quality and canning methods of West Coast Dungeness crab, the season for which runs from about January to June. According to this bulletin, more efficient production systems should be devised to reduce production costs and still maintain the quality of the crabmeat. The detailed recommended procedure for the canning of Dungeness crabmeat given in the bulletin was a result of experimental work conducted at the Seafoods Laboratory and later tried with commercial packers. It is stated that the procedure given is the best devised for retaining the natural flavor, color, and texture of the Dungeness crabmeat.

Home Canning of Tuna, Watermelon Bonito (Ocean Bonito), and Albacore (False Albacore) by C. B. Kelly and J. R. Westman. State of New York Conservation Department, Albany, N. Y.,

1948, 7 p., illus., printed. Free. The purpose of this bulletin is to provide the necessary information for home canning a superior yet inexpensive product from bluefin tuna, ocean bonito, and false albacore. The recipe recommended differs from that contained in many published pamphlets and articles in that it is more similar to the recipe often recommended for the home canning of salmon. The equipment needed and directions for cleaning and filleting the fish, packing the jars, and cooking are included.

Statistical Report on Fresh and Canned Fishery Products, Year 1947. (Includes Sardine Canning and Reduction Plants Report, Season 1947-48). Circular No. 22. Bureau of Marine Fisheries, Division of Fish and Game, Department of Natural Resources, State of California. Free.

American Business and European Recovery. Economic Cooperation Administration, Washington, D. C., July 1948, 33 p., printed. Free. A booklet that outlines the operations of the Economic Cooperation Administration and the purchasing procedures of participating countries. Explaining that ECA is a financing agency and not a purchasing agency, the booklet points out that the American businessman's contacts should be with the foreign businessman, the foreign government, and the export license office of the U. S. Department of Commerce. Since it outlines briefly the buying methods of the various participating countries and lists addresses of foreign purchasing missions and embassies, the booklet will be of value to firms desiring to sell fishery products abroad. In addition, the booklet contains forms of Administrator's letters of commitment to banking institutions and suppliers.

Information for Americans Going Abroad. Economic Cooperation Administration, Washington, D. C., July 1948, 23 p., printed. Free.

Processing -- Miscellaneous Service Division

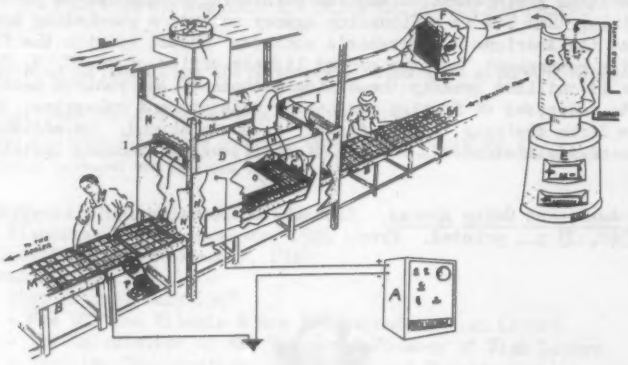
Illustrator -- Gustaf T. Sundstrom Compositors -- Margaret C. Harris and Norma D. Loeffel

43351

THE ELECTROSTATIC SMOKING OF SARDINES

Fishery Leaflet 270, "The Electrostatic Smoking of Sardines," by W. S. Hamm and W. A. Rust, gives a report on the smoking of sardines electrostatically. This 4-page report, with a sketch of the pilot smoking plant, explains how, in experiments on a semi-commercial scale, sardines were electrostatically smoked in unsealed cans. As the cans were conveyed through the smoking chamber, they formed the negative side of an electric field of 14,000 to 23,000 volts. In about 12 seconds passage time, the sardines were sufficiently smoked, and the conveyor carried the cans onward to be filled with oil and sealed.

According to the report, best results were obtained when the smoke passed from the smoke furnaces through a washing chamber--where soot and some of the moisture and acrid components were deposited--and then through a heater before entering the smoke precipitation chamber.



The above mentioned Fishery Leaflet can be obtained free upon request from the U. S. Fish and Wildlife Service, Washington 25, D. C.

University of Michigan General Library.
Ann Arbor,
128D Michigan.

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WASHINGTON 25, D. C.

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